TOSHIBA

SERVICE MANUAL

REVERSING AUTOMATIC DOCUMENT FEEDER

MR-3016

File No. SME04001100
R04022143400-TTEC
Ver01_2004-11

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General Precautions for Installation/Servicing/Maintenance for the MR-3016

The installation and service should be done by a qualified service technician.

1) When installing the MR-3016 to the Equipment, be sure to follow the instructions described in the “Unpacking/Set-Up Procedure for the MR-3016” booklet which comes with each unit of the MR-3016.

2) The MR-3016 should be installed by an authorized/qualified person.

3) Before starting installation, servicing or maintenance work, be sure to turn OFF and unplug the equipment first.

4) When servicing or maintaining the MR-3016, be careful about the rotating or operation sections such as gears, pulleys, sprockets, cams, belts, etc.

5) When parts are disassembled, reassembly is basically the reverse of disassembly unless otherwise noted in this manual or other related materials. Be careful not to reassemble small parts such as screws, washers, pins, E-rings, toothed washers to the wrong places.

6) Basically, the machine should not be operated with any parts removed or disassembled.

7) Delicate parts for preventing safety hazard problems (such as switches, sensors, etc. if any) should be handled/installed/adjusted correctly.

8) Use suitable measuring instruments and tools.

9) During servicing or maintenance work, be sure to check the serial No. plate and other cautionary labels (if any) to see if they are clean and firmly fixed. If not, take appropriate actions.

10) The PC board must be stored in an anti-electrostatic bag and handled carefully using a wristband, because the ICs on it may be damaged due to static electricity. Before using the wrist band, pull out the power cord plug of the equipment and make sure that there is no uninsulated charged objects in the vicinity.

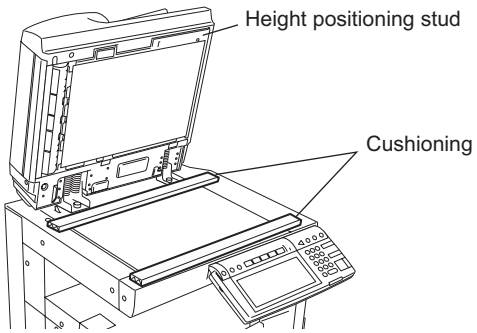
11) For the recovery and disposal of used MR-3016, consumable parts and packing materials, follow the relevant local regulations/rules should be followed.

12) After completing installation, servicing and maintenance of the MR-3016, return the MR-3016 to its original state, and check operation.

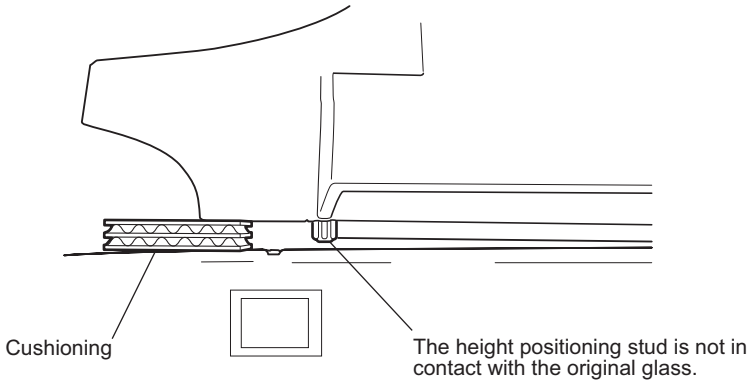
PREPARATION FOR TRANSPORTATION OF EQUIPMENT

Before transporting the equipment on which mounts the MR-3016, take off the MR-3016 or insert some cushioning material underneath the MR-3016 as shown in the following figures.

1) Use pieces of the corrugated board came in the package of MR-3016 or equivalent as the cushioning. Insert the cushioning as shown in the figure, then close the MR-3016.



2) Make sure that the height positioning stud is not in contact with the original glass.



CONTENTS

1. SPECIFICATION 1-1

2. CONFIGURATION 2-1

3. SECTIONAL VIEW AND DRIVE SYSTEM 3-1
3.1 Sectional View 3-1
3.2 Drive System 3-2

4. LAYOUT OF ELECTRICAL PARTS 4-1
4.1 Symbols 4-1
4.2 Layout of Electrical Parts 4-3
4.3 Diagram of Signal Blocks 4-4
4.4 Description of Interface Signals 4-5

5. DESCRIPTION OF OPERATIONS 5-1
5.1 Single Side Feeding 5-1
5.2 Duplex Feeding 5-6
5.3 Single Side Feeding (for Mixed Sized Originals) 5-15

6. JAMMING 6-1
6.1 Feeding Jam 6-1
6.1.1 Not reaching original length sensor 6-1
6.1.2 Not reaching registration sensor 6-1
6.2 Transport Jam 6-2
6.2.1 Stop jam at the original length sensor 6-2
6.2.2 Stop jam at the registration sensor 6-2
6.2.3 Not reaching the read sensor 6-2
6.2.4 Stop jam at the read sensor-1 6-3
6.2.5 Stop jam at the read sensor-2 6-3
6.2.6 Not reaching the exit sensor-1 6-3
6.2.7 Not reaching the reverse sensor-1 6-3
6.3 Exit Jam 6-4
6.3.1 Stop jam at the exit sensor 6-4
6.4 Reversing Jam 6-5
6.4.1 Not reaching the exit sensor-2 6-5
6.4.2 Not reaching the reverse sensor-2 6-5
6.4.3 Stop at the reverse sensor-1 6-5
6.4.4 Stop at the reverse sensor-2 6-5
6.5 Error 6-6
6.5.1 Types of error detection 6-6
6.5.2 Adjustment error of sensors 6-6
6.5.3 EEPROM error 6-6
6.5.4 Fan motor lock error 6-6
6.6 Display on LED 6-7

7. ORIGINAL SIZE DETECTION 7-1
7.1 Method of Original Size Detection (for Normal Operation) 7-2
7.2 Method of Original Size Detection (for Mixed Sized Originals) 7-3
7.3 Relation between Status of Sensor and Original Size 7-4

8. FLOW CHART 8-1
8.1 Power ON Operation - 1 8-1
8.2 Power ON Operation - 2 8-2
8.3 Initialization Operation 8-3
8.4 Pickup Roller Downward/Separation Movement Control 8-4

8.5 Registration Control - 1 8-5
8.6 Registration Control - 2 8-6
8.7 Pre-Feed Leading Edge Control 8-7
8.8 Leading Edge of Original Scanning Control 8-8
8.9 Trailing Edge of Original Scanning Control 8-9
8.10 Leading Edge Control at Reversing 8-10
8.11 Trailing Edge Control at Reversing 8-11
8.12 Back Side Registration Leading Edge Control 8-12
8.13 Back Side Registration Trailing Edge Control 8-13
8.14 Leading/Trailing Edge Control at Paper Exiting 8-14
8.15 Next Original Detection Control 8-15

9. TIMING CHART 9-1
9.1 Single-sided Original 9-1
9.2 Double-sided Original 9-2

10. DESCRIPTION OF CIRCUITS 10-1
10.1 Input Circuits for Original Length Sensor, Read Sensor and Reverse Sensor 10-1
10.2 Inrush Current Control Circuit 10-2
10.3 Drive Circuit for Read Motor 10-3
10.4 Drive Circuit for Reverse Motor 10-4
10.5 Drive Circuit for Feed Motor 10-5
10.6 Drive Circuit for Fan Motor 10-6
10.7 Drive Circuit for Reverse Solenoid 10-7
10.8 Reset Circuit 10-8
10.9 EEPROM Circuit 10-9

11. DESCRIPTION OF INPUT/OUTPUT SIGNALS 11-1
11.1 REQ Signal, ACK Signal and TxD Signal 11-1
11.2 DF-ACK Signal, DF-REQ Signal and RxD Signal 11-2
11.3 Input Circuits for Sensors 11-3

12. DISASSEMBLY AND ASSEMBLY 12-1
12.1 Pickup Roller and Feed Roller 12-1
12.2 Separation Roller 12-2
12.3 Reverse Solenoid 12-3
12.4 Fan Motor 12-4
12.5 Read Motor 12-5
12.6 RADF Opening/Closing Switch 12-7
12.7 Feed Motor 12-8
12.8 Reverse Motor 12-9
12.9 RADF Opening/Closing Sensor 12-11
12.10PC Board 12-12
12.11Jam Access Cover Switch 12-13
12.12Tray Sensor 12-14
12.13Empty Sensor/Registration Sensor/Original Width Sensor/Original Length Sensor 12-15
12.14Read Sensor 12-18
12.15Exit Sensor 12-19
12.16Reverse Sensor 12-20
12.17Tray Volume 12-21

13. ADJUSTMENT 13-1
13.1 Adjustment of RADF Position 13-2
13.2 Adjustment of RADF Height 13-6
13.3 Adjustment of Skew 13-8
13.4 Automatic Adjustment of Sensors and Initialization of EEPROM 13-10
13.5 Adjustment of Aligning 13-11
13.6 Adjustment of Aligning at Reversing 13-12

13.7 Adjustment of Reverse Solenoid 13-13
13.8 Adjustment of RADF Opening/Closing Switch 13-15
13.9 Adjustment of RADF Opening/Closing Sensor 13-16
13.10Attachment of Mylars 13-17
13.11Adjustment of Tray Volume 13-23

14. SERVICE 14-1
14.1 Troubleshooting for Mechanical Errors 14-1
14.2 Troubleshooting for Electrical Errors 14-3

15. ASSEMBLY OF PC BOARD 15-1
15.1 Assembly of PC Board 15-1

16. MAINTENANCE AND CHECKING 16-1
16.1 Periodic Maintenance 16-1
16.2 Rewriting ROM (Firmware Updating) 16-3
16.2.1 Procedure 16-3
16.2.2 LED displays and contents 16-3

17. CIRCUIT DIAGRAM / HARNESS DIAGRAM 17-1
17.1 Circuit Diagram 17-1
17.2 Harness Diagram 17-2
17.3 Control PC Board Circuit 17-3

1. SPECIFICATION

Model Name	MR-3016
Capacity of Original Feeding Tray	Up to 100 sheets
Acceptable Original Size	Size: A5-R, A4, A4-R, B5, B5-R, B4, A3, FOLIO, ST-R, LT, LT-R, LG, LD, COMPUTER, Personal check (69.8 × 152.4 mm, 79.4 × 209.5 mm) (2.75 × 6.00 inches, 3.13 × 8.25 inches) Basis weight: 50 to 127 g/m^2 or 13.3 to 34 lb. Bond (Single-sided) 50 to 105 g/m^2 or 13.3 to 28 lb. Bond (Double-sided) 60 to 90 g/m^2 or 16 to 24 lb. Bond (Personal check)
Power Source	Power supplied from the equipment
Power Consumption	43.6 W
Dimensions	W 557 mm × D 530 mm × H 165 mm (W 22 inches × D 20.9 inches × H 6.5 inches)
Weight	Approx.15.0 kg or 33.07 lb.

* Specification and appearance are subject to change without notice due to enhancement of product quality.

2. CONFIGURATION

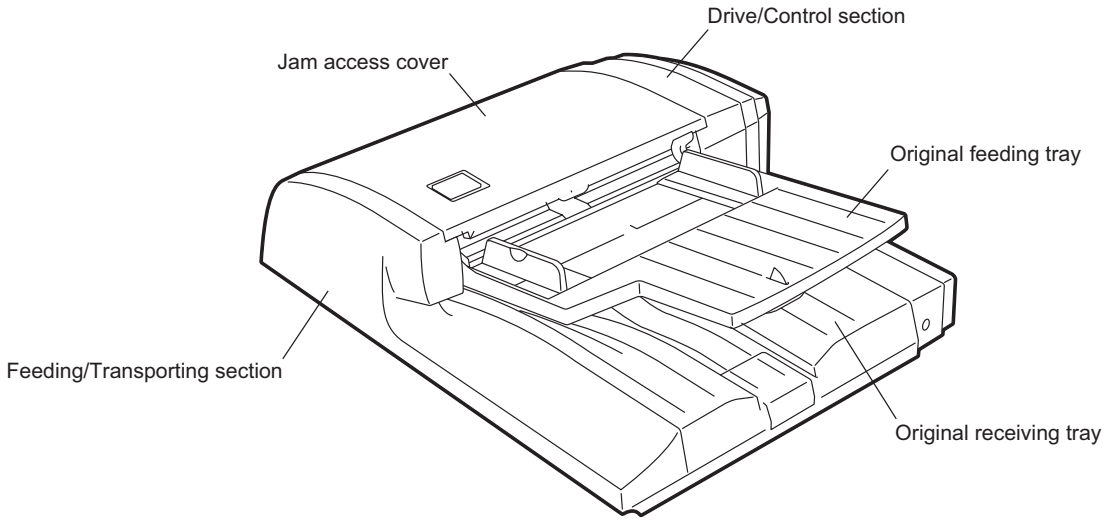


Fig.2-1

	Mechanical	Electrical parts
Feeding/Transporting section	• Jam access cover • Pickup roller • Feed roller • Separation roller • Registration roller • Read roller • Reverse roller • Exit roller	• Empty sensor • Original length sensor • Registration sensor • Original width sensor • Read sensor • Reverse sensor • Exit sensor
Original feeding tray section	• Original feeding tray	• Tray sensor • Tray volume
Drive/Control section		• Feed motor • Read motor • Reverse motor • Reverse solenoid • RADF opening/closing sensor • RADF opening/closing switch • Jam access cover switch • PC board

3. SECTIONAL VIEW AND DRIVE SYSTEM

3.1 Sectional View

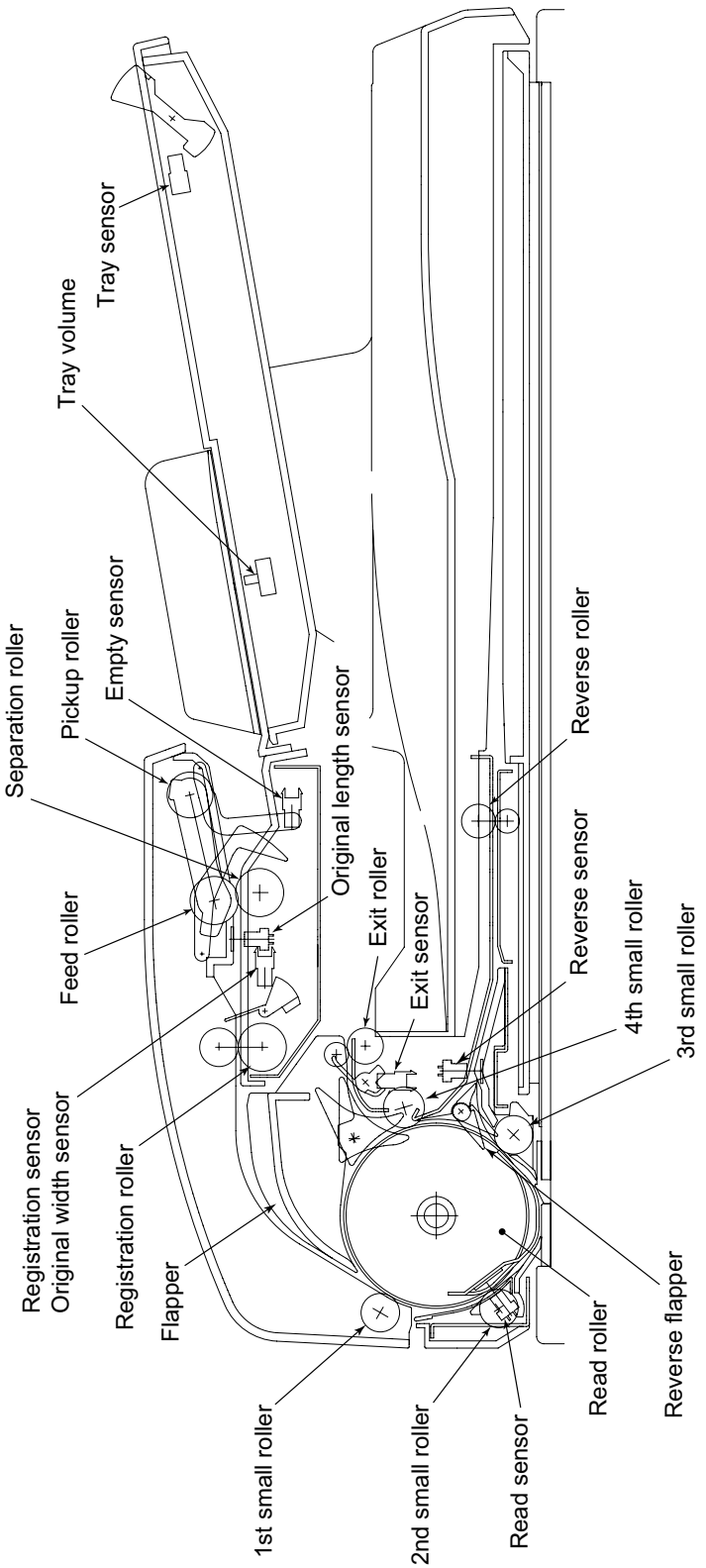


Fig.3-1

3.2 Drive System

1) Feed motor rotating clockwise (as seen from the front side)

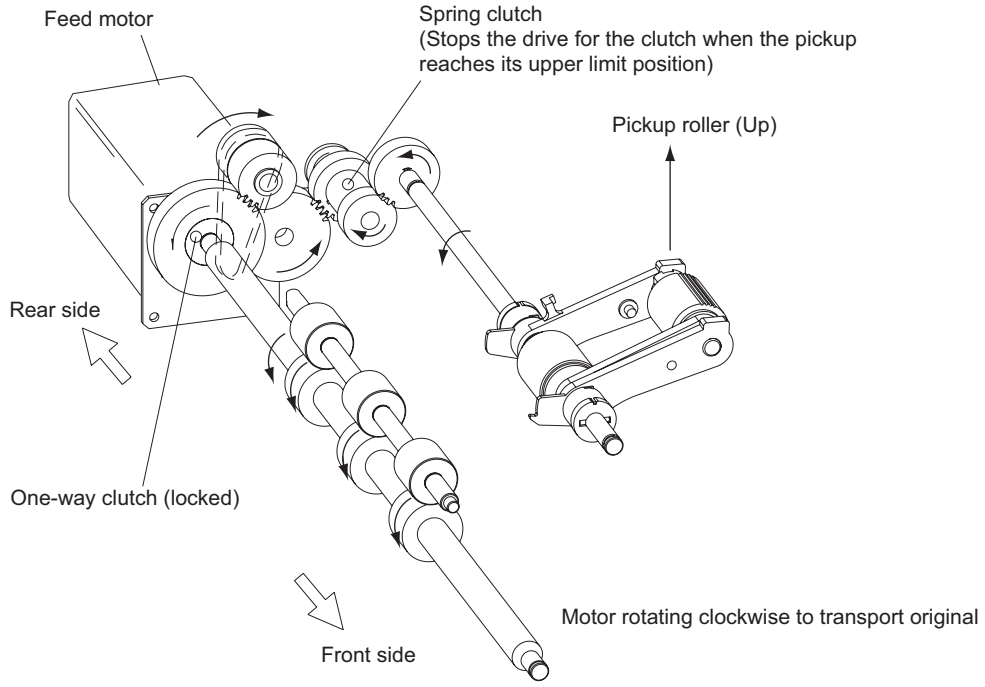

Feed motor
Spring clutch
(Stops the drive for the clutch when the pickup reaches its upper limit position)
Pickup roller (Up)
Rear side
One-way clutch (locked)
Front side
Motor rotating clockwise to transport original

Fig.3-2

2) Feed motor rotating counterclockwise (as seen from the front side)

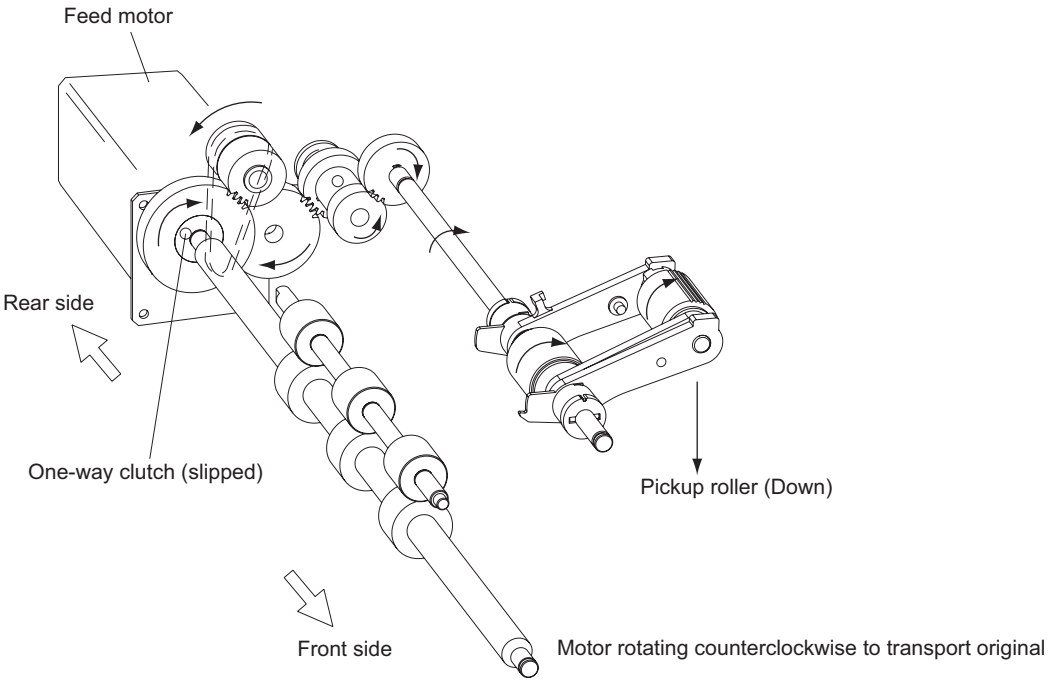


Fig.3-3

3) Read motor rotating clockwise (as seen from the front side)

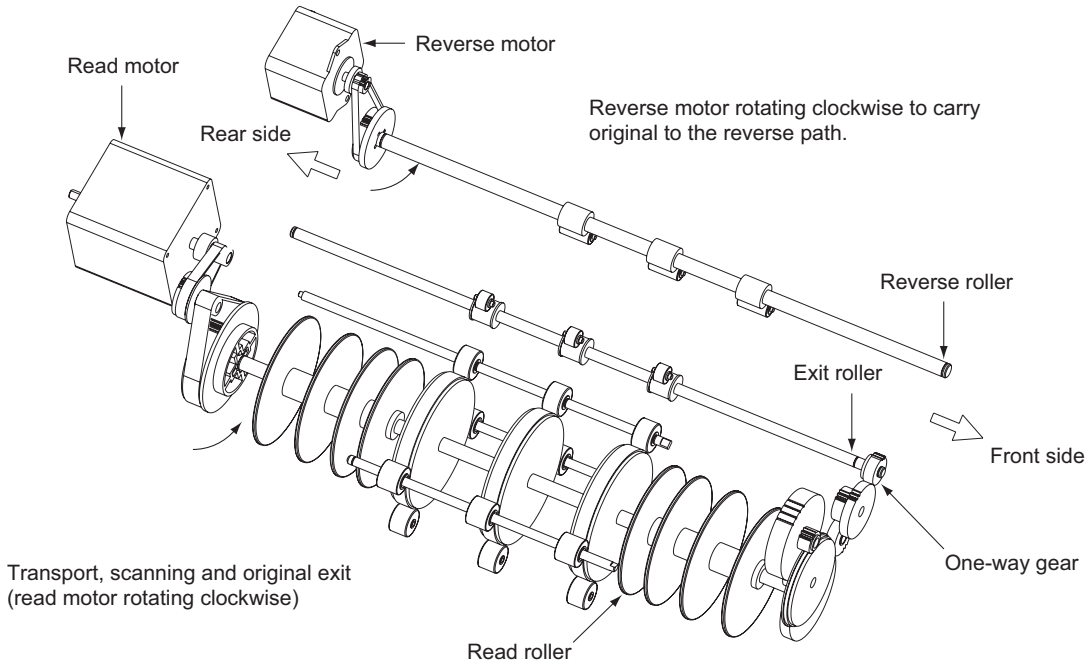


Fig.3-4

4) Read motor rotating counterclockwise (as seen from the front side)

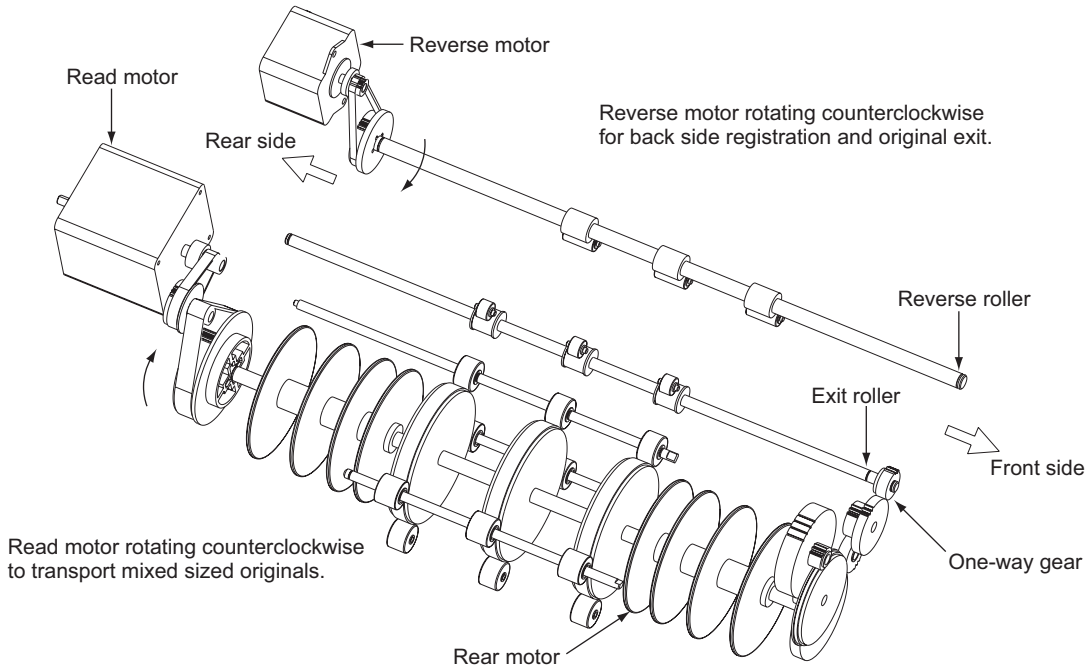


Fig.3-5

4. LAYOUT OF ELECTRICAL PARTS

4.1 Symbols

1) Motors

Symbol	Name	Function	Remarks
RDMOT	RD-MOT (Read motor)	Drives transport roller and exit roller	Pulse motor
RVMOT	RVS-MOT (Reverse motor)	Drives reverse roller	Pulse motor
FMOT	FED-MOT (Feed motor)	Drives pickup roller, feed roller and registration roller	Pulse motor
FAN	FAN (Fan motor)	Cools down read motor	Fan motor

2) Solenoid

Symbol	Name	Function	Remarks
RSOL	RVS-SOL (Reverse solenoid)	Switches flapper	DC solenoid

3) Switches and Sensors

Symbol	Name	Function	Remarks
JAMSW	JAM-SW (Jam access cover switch)	Switch to detect if jam access cover for feeding section is opened/closed	Microswitch
OPNSW	RADF-OPN-SW (RADF opening/closing switch)	Switch to detect if RADF unit is opened/closed	Microswitch
EMPS	EMP-SNS (Empty sensor)	Sensor to detect original on original tray	Semiconductive optical sensor
REGS	REG-SNS (Registration sensor)	Sensor to detect original at registration position	Semiconductive optical sensor
EXITS	EXIT-SNS (Exit sensor)	Sensor to detect original at exit section	Semiconductive optical sensor
SIZE1	SIZE-SNS 1 (Original width sensor-1)	Original width detection sensor-1	Semiconductive optical sensor
SIZE3	SIZE-SNS 3 (Original width sensor-3)	Original width detection sensor-3	Semiconductive optical sensor
TRYS	TRY-SNS (Tray sensor)	Sensor to detect length of original on original tray	Semiconductive optical sensor
OPNSN	RADF-OPN-SNS (RADF opening/closing sensor)	Sensor to detect if RADF unit is opened/closed	Semiconductive optical sensor
LENGS	LENG-SNS (Original length sensor)	Sensor to detect length of original	Semiconductive optical sensor
READS	READ-SNS (Read sensor)	Sensor to detect leading edge of original at scanning position	Semiconductive optical sensor
RVRS	RVR-SNS (Reverse sensor)	Sensor to detect original at reverse position	Semiconductive optical sensor
TRVR	TRY-VR (Tray volume)	Original width detection sensor	Rotary volume

4) PC board

Symbol	Name	Function	Remarks
PWA-DF	PWA-LGC-RADF (PC board)	Drives feeding and transportation	

4.2 Layout of Electrical Parts

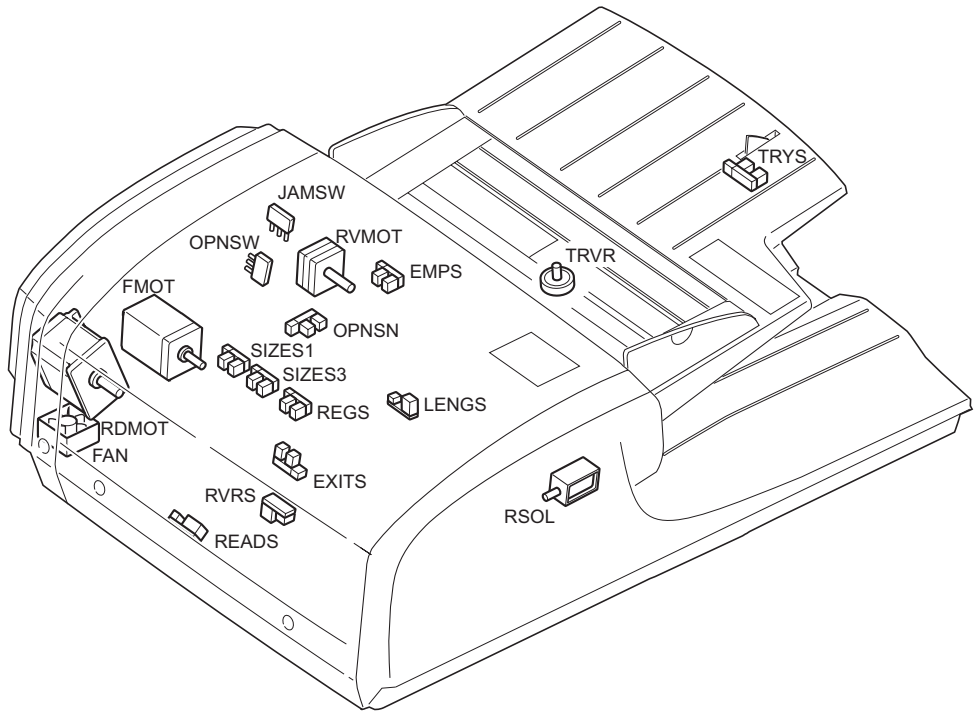


Fig.4-1

RDMOT	Read motor
RVMOT	Reverse motor
FMOT	Feed motor
FAN	Fan motor
RSOL	Reverse solenoid
JAMSW	Jam access cover switch
OPNSW	RADF opening/closing switch
EMPS	Empty sensor
REGS	Registration sensor
EXITS	Exit sensor
SIZES1	Original width sensor-1
SIZES3	Original width sensor-3
TRYS	Tray sensor
OPNS	RADF opening/closing sensor
LENGS	Original length sensor
READS	Read sensor
RVRS	Reverse sensor
TRVR	Original width sensor

4.3 Diagram of Signal Blocks

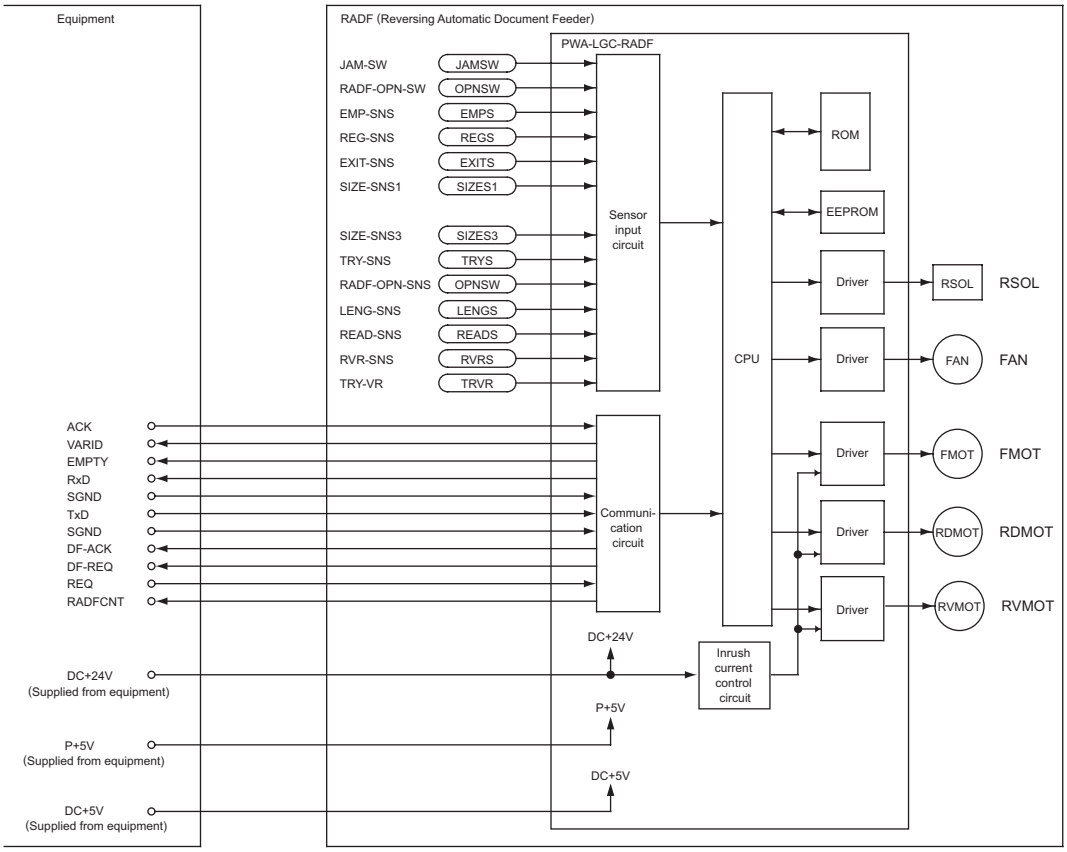


Fig.4-2

4.4 Description of Interface Signals

The following 6 lines are used to transmit/receive signals between the equipment and the RADF.
REQ .....Communication request signal (from equipment to the RADF)
DF-REQ .....Communication request signal (from the RADF to equipment)
DF-ACK.....Communication request acknowledging signal (from the RADF to equipment)
ACK.....Communication request acknowledging signal (from equipment to the RADF)
TxD .....Data transmitted from equipment to the RADF
RxD .....Data transmitted from the RADF to equipment

Data communication (RxD and TxD) between the scanner and the RADF has adopted the serial communication system which does not allow checking using testing devices to see whether the signals are transmitted/received properly in the field.

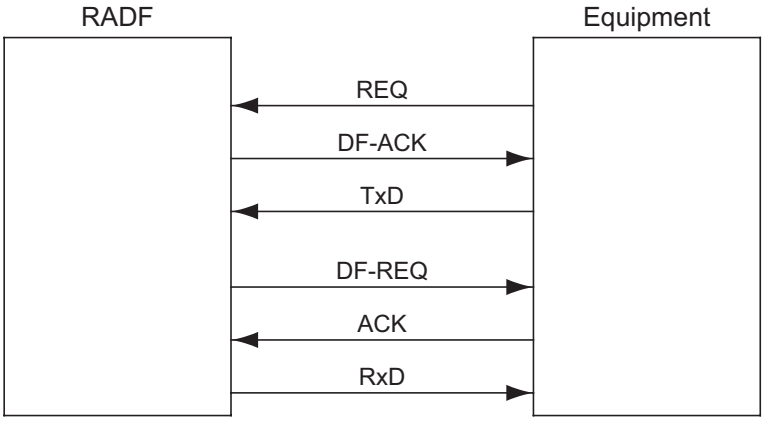


Fig.4-3

5. DESCRIPTION OF OPERATIONS

5.1 Single Side Feeding

(A4/LT, reproduction ratio 100%)

(1) Setting original

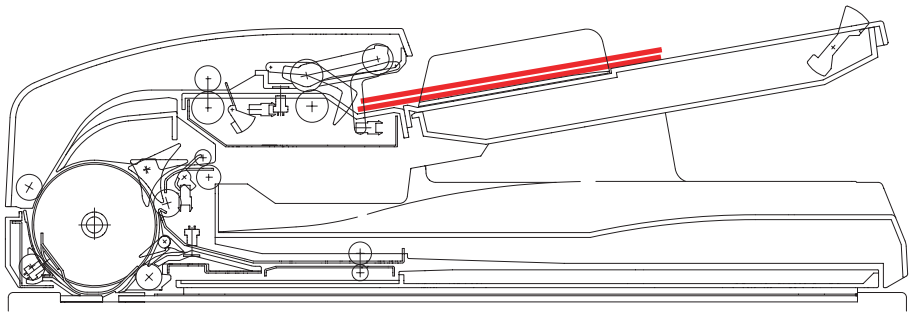


Fig.5-1

The original is set on the tray, the empty sensor is turned ON, and the original set ON signal is sent to the equipment.

(2) Start of pre-feeding operation → Completion of pre-feeding operation

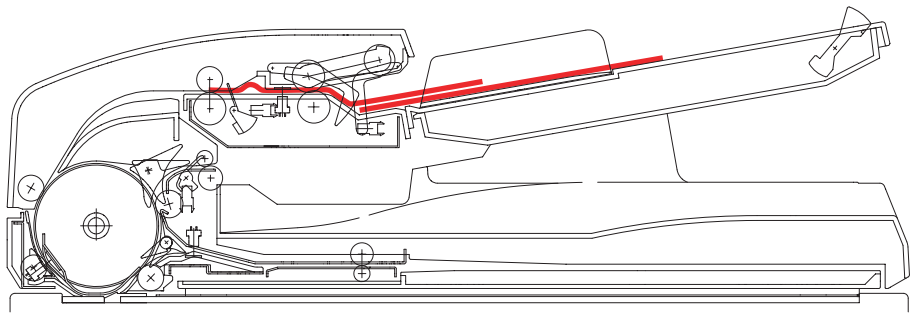


Fig.5-2

A feed signal is sent from the equipment, the feed motor starts rotating forward and rotates the pickup roller and feed roller to start the pre-feeding operation. The registration sensor is turned ON and the registration roller rotates for a certain number of pulses to align the paper, and then the feed motor stops.

(3) Start of feeding operation → Original length sensor OFF

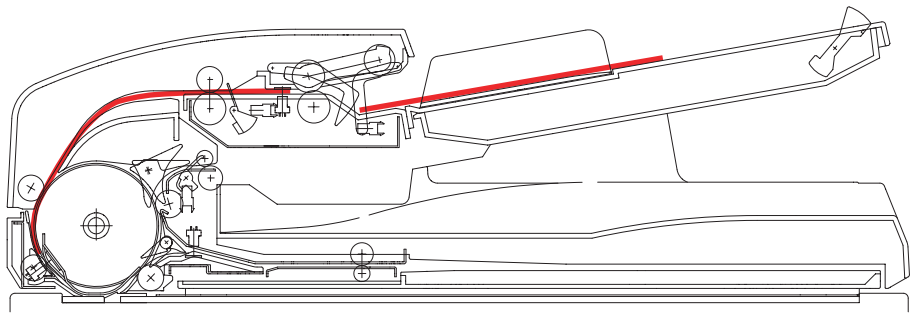


Fig.5-3

The feed motor starts rotating in reverse and the read motor starts rotating forward. The registration roller, the read roller and exit roller are rotated to start feeding the original waiting at the pre-feeding position. While the pickup roller is raised by rotating the feed motor in reverse, the original shutter is lowered. The feed motor is stopped after the original length sensor is turned OFF.

(4) Original length sensor OFF → Completion of feeding operation

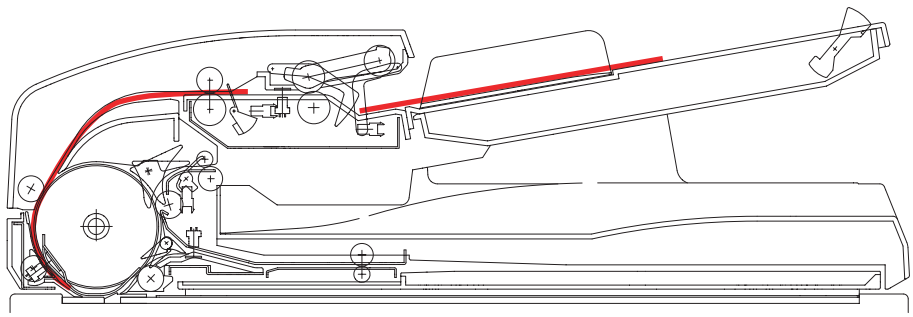


Fig.5-4

The feed motor starts rotating forward and rotates for a certain number of pulses, and then the pickup roller is lowered. (The pickup roller waits for the next pre-feeding operation in that lowered position.)
The read sensor is turned ON and the read motor rotates for a certain number of pulses, and then the read motor stops. (The leading edge of the original reaches the pre-scanning position.)

(5) Start of scanning operation → Start of pre-feeding operation for next original

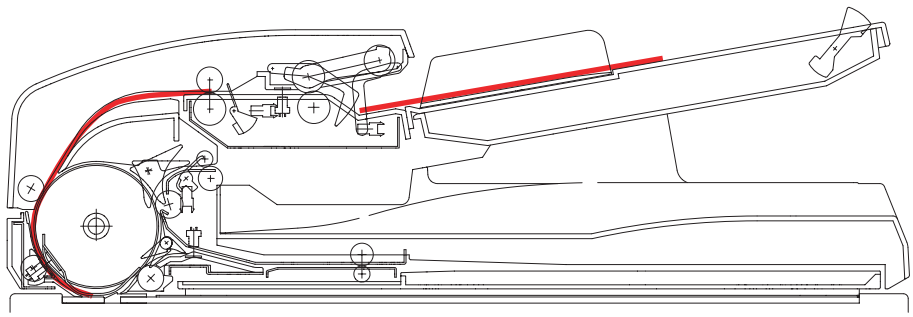


Fig.5-5

The original transport signal is sent from the equipment, and the read motor starts rotating forward. The read roller and exit roller are rotated to start scanning the original. The feed motor rotates the pickup roller and feed roller after the trailing edge of the original has passed the registration roller to start the pre-feeding operation for the next original.
In case of color original, the pre-feeding operation for the next original starts after finishing scanning the original.

(6) Start of pre-feeding operation for next original → Completion of pre-feeding operation

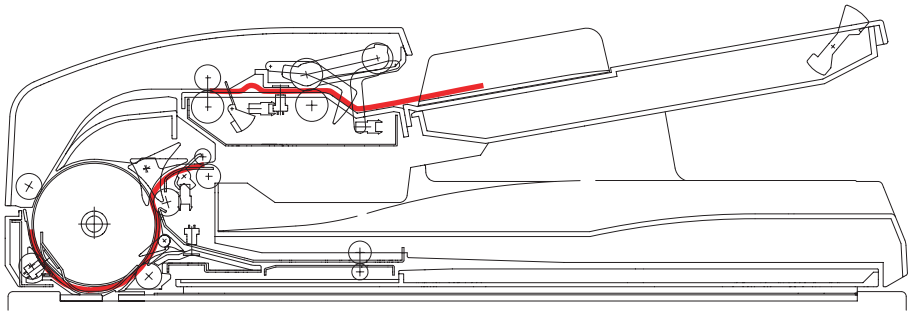


Fig.5-6

The registration sensor is turned ON and the registration roller rotates for a certain number of pulses, and then the feed motor stops.

(7) Start of feeding operation for next original → Completion of scanning operation

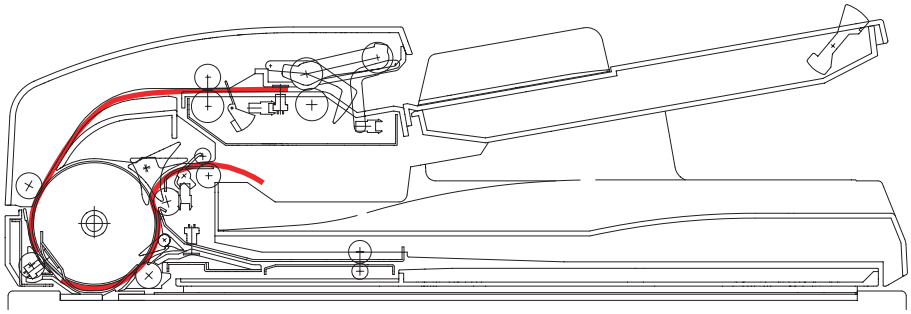


Fig.5-7

The feed motor starts rotating in reverse, and rotates the registration roller to feed the next original waiting at the pre-feeding position. While the pickup roller is raised by rotating the feed motor in reverse, the original shutter is lowered. When the empty sensor is turned OFF, the original set OFF signal is sent to the equipment. The feed motor is stopped after the original length sensor is turned OFF.
The feed motor starts rotating forward and rotates for a certain number of pulses, and then the pickup roller is lowered.
The scanning operation is completed when the trailing edge of the original being scanned has passed the scanning position.

(8) Completion of scanning operation → Completion of feeding operation for next original

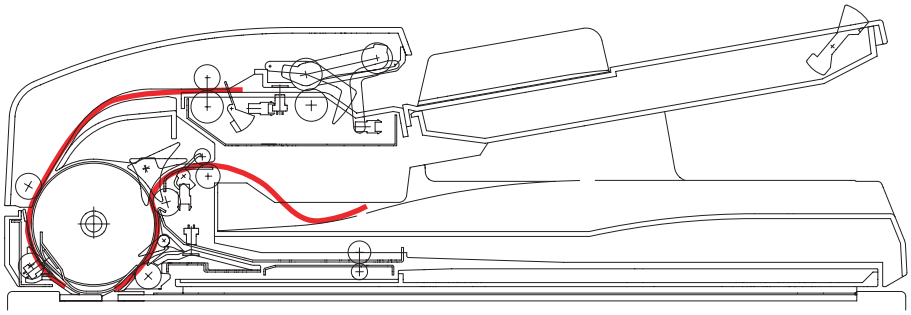


Fig.5-8

The read sensor is turned ON and the read motor rotates for a certain number of pulses, and then the read motor stops.
(The leading edge of the next original reaches the pre-scanning position.)

(9) Start of scanning operation for next original → Completion of original exit

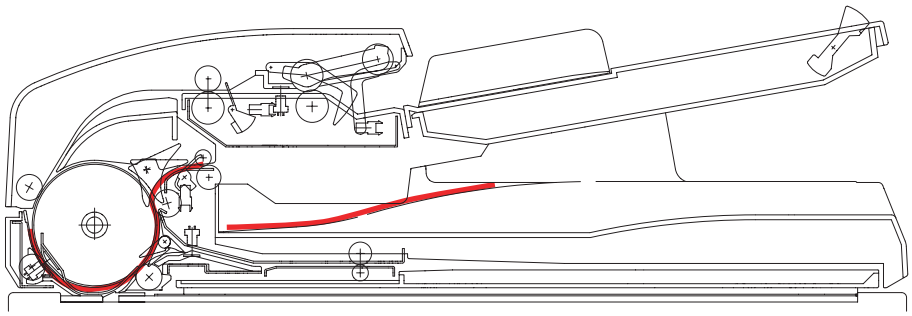


Fig.5-9

When the original transport signal is sent, the read motor starts rotating forward and rotates the read roller and exit roller to start scanning the next original. Original exit is completed when the trailing edge of the original has passed the exit roller.

(10) Completion of scanning operation for next original

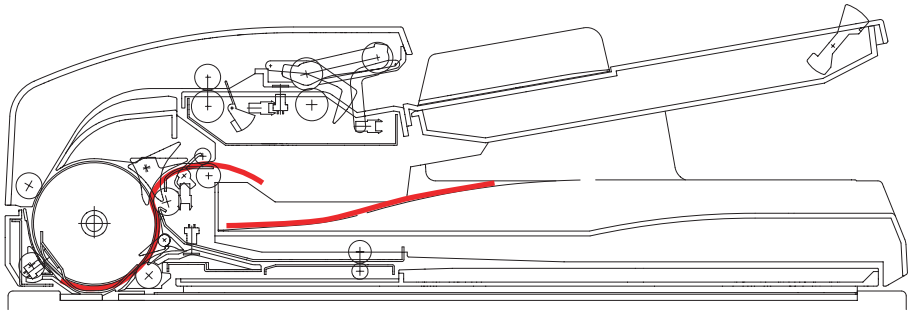


Fig.5-10

Scanning is completed when the trailing edge of the next original has passed the scanning position and the original is carried toward the receiving tray.
The feed motor starts rotating in reverse and rotates for a certain number of pulses, and then the pickup roller is raised.

(11) Exit sensor OFF (next original)

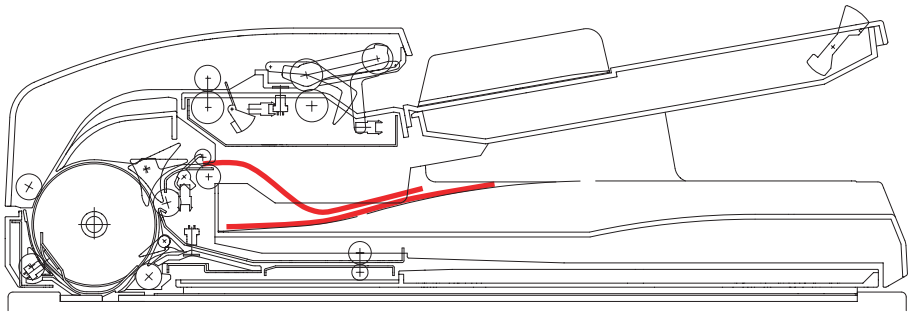


Fig.5-11

After the exit sensor is turned OFF, the read motor rotates for a certain number of pulses until the original exits completely.

(12) Completion of original exit operation (next original)

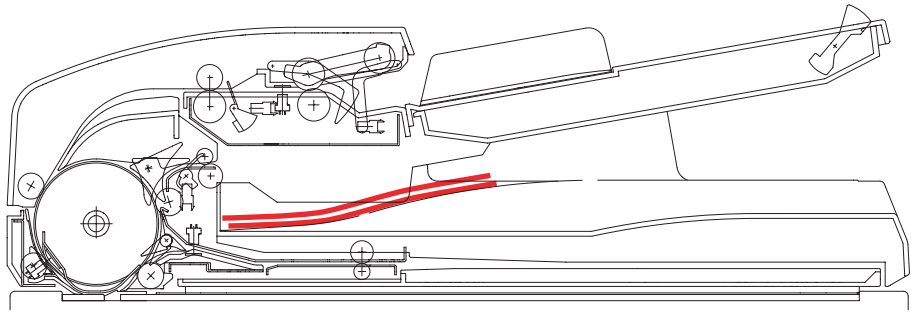


Fig.5-12

The read motor is stopped and the exit operation is completed when the next original exits completely into the receiving tray.

5.2 Duplex Feeding

(A4/LT, reproduction ratio 100%)

(1) Setting original

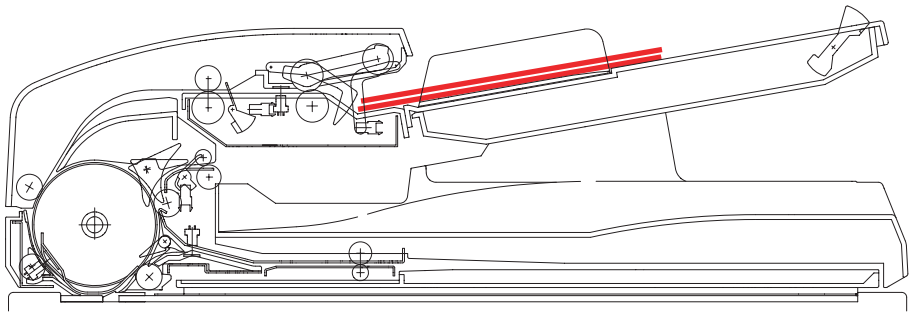


Fig.5-13

The original is set on the tray, the empty sensor is turned ON, and the original set ON signal is sent to the equipment.

(2) Start of pre-feeding operation → Completion of pre-feeding operation

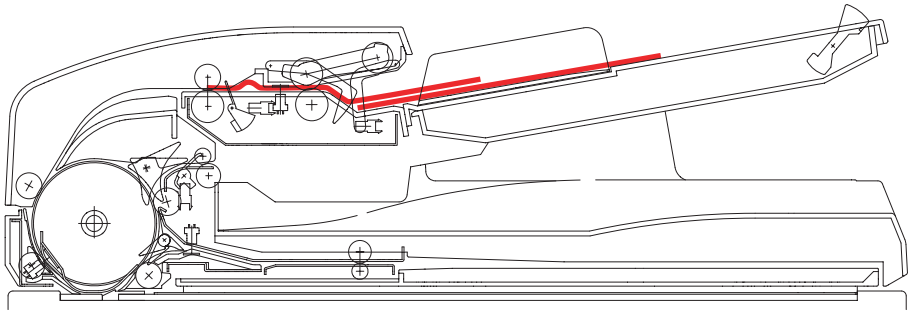


Fig.5-14

A feed signal is sent from the equipment, the feed motor starts rotating forward and rotates the pickup roller and feed roller to start the pre-feeding operation. The registration sensor is turned ON and the registration roller rotates for a certain number of pulses to align the paper, and then the feed motor stops.

(3) Start of feeding operation → Original length sensor OFF

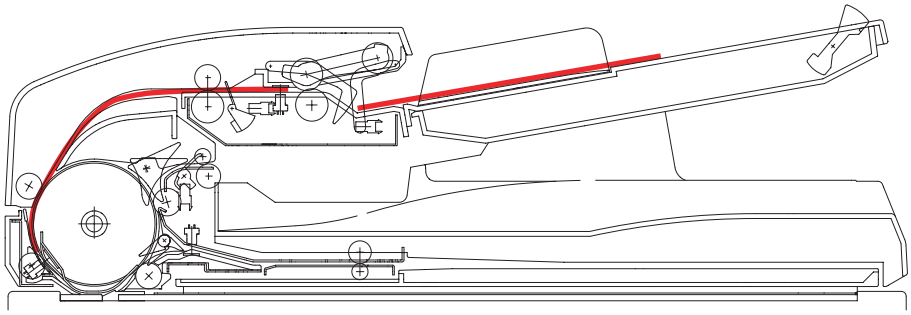


Fig.5-15

The feed motor starts rotating in reverse and the read motor starts rotating forward. The registration roller, the read roller and exit roller are rotated to start feeding the original waiting at the pre-feeding position. While the pickup roller is raised by rotating the feed motor in reverse, the original shutter is lowered. The feed motor is stopped after the original length sensor is turned OFF.

(4) Original length sensor OFF → Completion of feeding operation

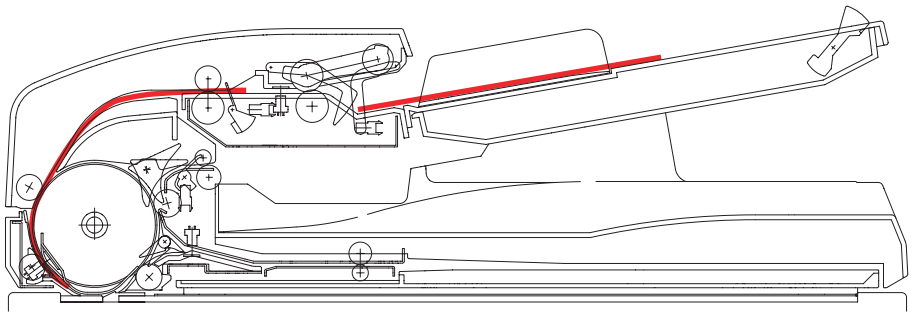


Fig.5-16

The feed motor starts rotating forward and rotates for a certain number of pulses, and then the pickup roller is lowered. (The pickup roller waits for the next pre-feeding operation in that lowered position.)
The read sensor is turned ON and the read motor rotates for a certain number of pulses, and then the read motor stops. (The leading edge of the original reaches the pre-scanning position.)

(5) Start of front side scanning operation → Start of pre-feeding operation for next original

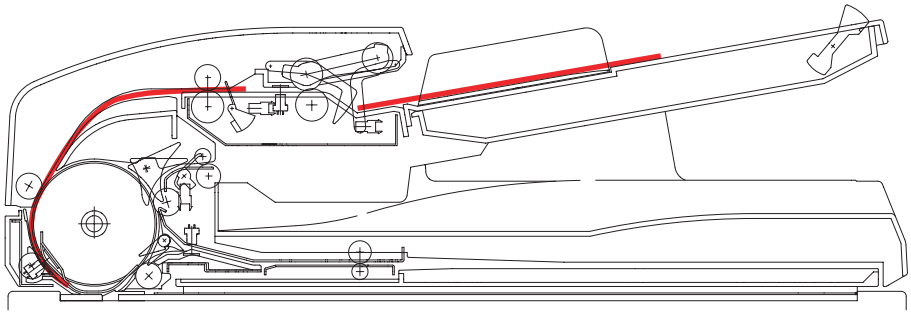


Fig.5-17

The original transport signal is sent from the equipment, and then the read motor starts rotating forward. The read roller and exit roller are rotated, the reverse flapper is switched to the reverse position by turning ON the reverse solenoid to start scanning the original. The reverse sensor is turned ON, the reverse motor starts rotating in reverse and the reverse roller rotates in reverse. The trailing edge of the original has passed the registration roller, and then the feed motor rotates the pickup roller and feed roller to start the pre-feeding operation for the next original.
In case of color original, the pre-feeding operation for the next original starts after finishing scanning the original.

(6) Start of pre-feeding operation for next original → Completion of pre-feeding operation → Completion of scanning operation for front side of original

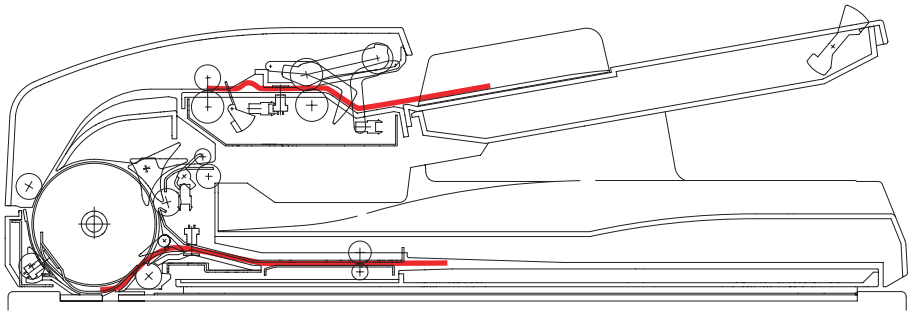


Fig.5-18

The registration sensor is turned ON and the registration roller rotates for a certain number of pulses to align the paper, and then the feed motor stops. Scanning of the front side of original is completed when the trailing edge of the original being scanned has passed the scanning position.

(7) Completion of transport operation for front side of original (original pausing at reverse position)

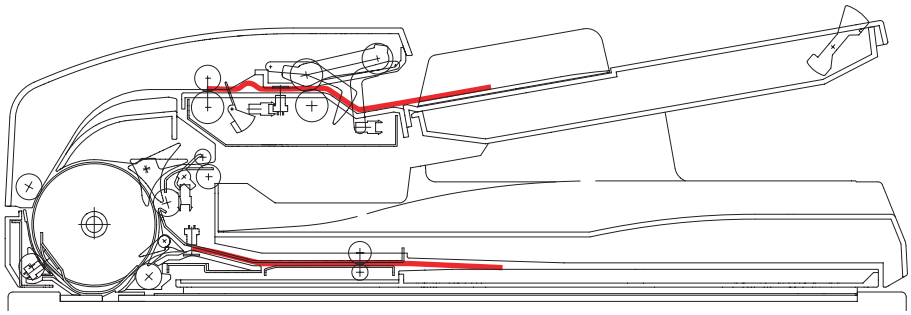


Fig.5-19

The reverse sensor is turned OFF, and then the read motor and reverse motor are stopped to complete transporting the front side of the original.

(8) Start of registration operation for backside of original → Completion of registration for backside of original

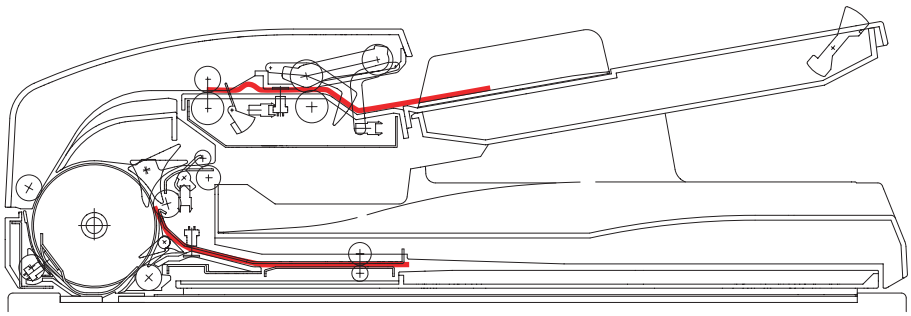


Fig.5-20

The reverse motor starts rotating in reverse and rotates the reverse roller in reverse to start the registration operation for the backside of the original pausing at the reverse position.
The reverse sensor is turned ON and the reverse roller rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(9) Start of reverse feeding operation → Completion of reverse feeding operation

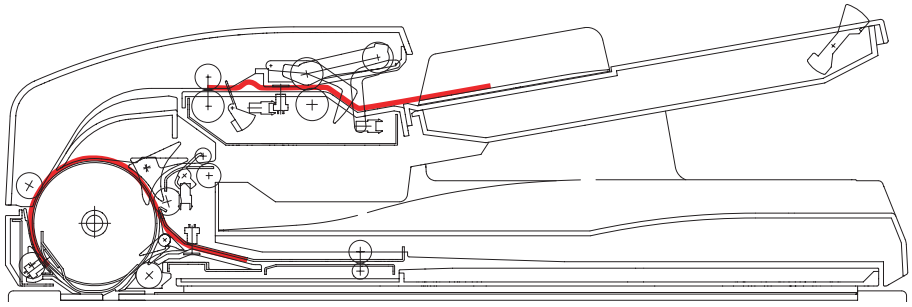


Fig.5-21

The read motor and the reverse motor start rotating, and then the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the original waiting at the back side registration position. The read sensor is turned ON, the read motor and reverse motor rotate for a certain number of pulses, and then both motors stop. (The leading edge of the original reaches the pre-back side scanning position.)

(10) Start of scanning operation for backside of original → Completion of scanning operation for back-side of original

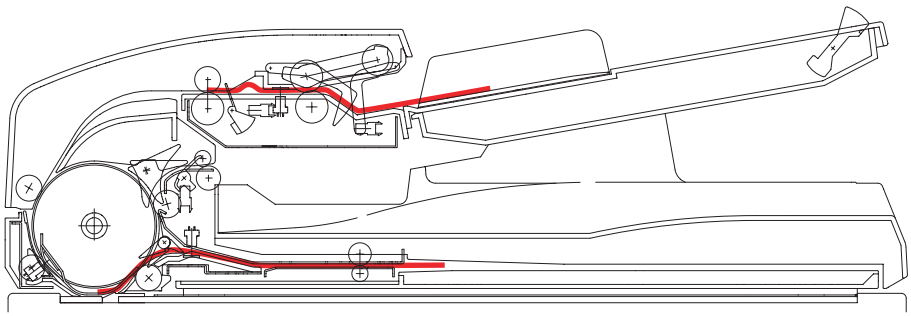


Fig.5-22

The original transport signal is sent from the equipment, and the read motor and the reverse motor start rotating, and then the read roller, exit roller and reverse roller are rotated to start scanning the backside of original.
The trailing edge of the original has passed the reverse roller and the reverse motor rotates for a certain number of pulses, and then the reverse motor pauses. Then the reverse motor starts rotating in reverse and rotates the reverse roller to be ready for the leading edge of the original to come into the reverse position. The scanning operation for the backside of the original is completed when the trailing edge of the original being scanned has passed the scanning position.

(11) Completion of transport operation for backside of original (original pausing at reverse position)

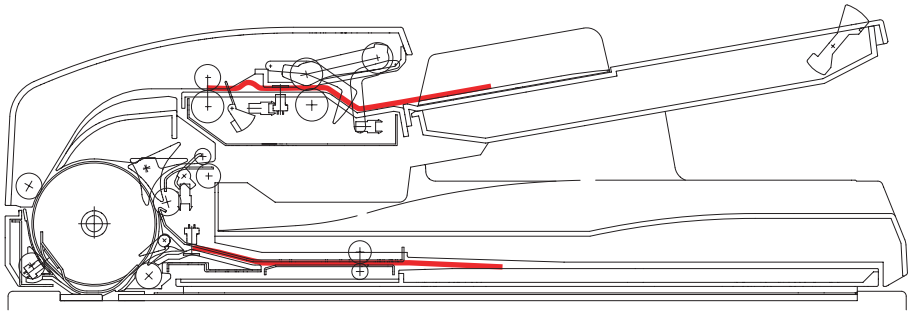


Fig.5-23

The reverse sensor is turned OFF, and then the read motor and reverse motor are stopped to complete transportation of the backside of the original.
The reverse flapper is switched to the exit side by turning OFF the reverse solenoid.

(12) Start of reverse exit operation → Start of feeding operation for next original → Original length sensor OFF

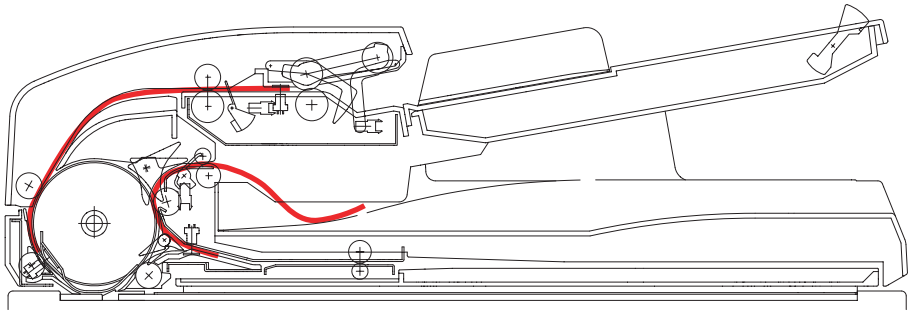


Fig.5-24

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse exit operation of the original pausing at the reverse position.
The reverse sensor is turned ON, the feed motor rotates for a certain number of pulses, starts rotating in reverse to rotate the registration roller, and then starts the feeding operation for the next original waiting at the pre-feeding position.
The empty sensor is turned OFF, and then the original set OFF signal is sent to the equipment.
The reverse motor is stopped after the reverse sensor is turned OFF.
The feed motor is stopped after the original length sensor is turned OFF.

(13) Original length sensor OFF → Completion of feeding operation for next original

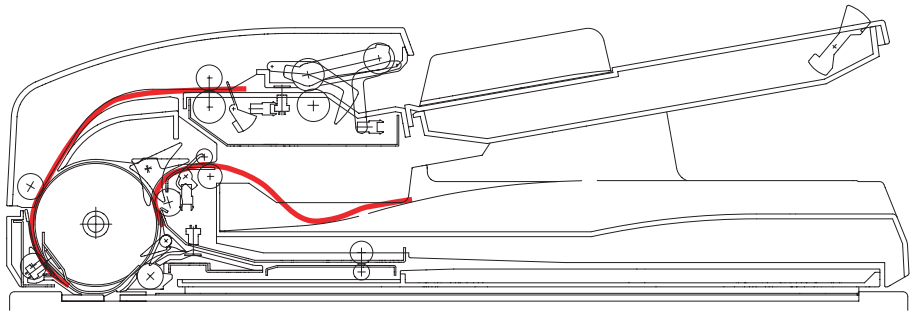


Fig.5-25

The feed motor starts rotating forward and rotates for a certain number of pulses, and then the pickup roller is lowered.
The read sensor is turned ON and the read motor rotates for a certain number of pulses, and then the read motor stops (The leading edge of the next original reaches the pre-scanning position for front side of original.)

(14) Start of scanning operation for front side of next original → Completion of reverse exit operation

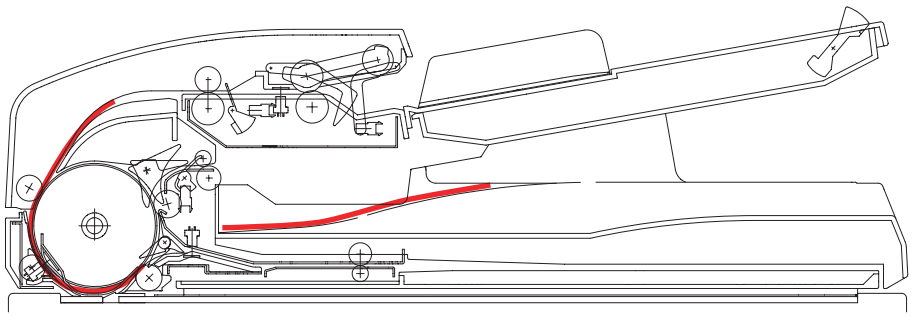


Fig.5-26

The original transport signal is sent from the equipment, and the read motor starts rotating forward.
The read roller and exit roller are rotated, and the reverse flapper is switched to the reverse position by turning ON the reverse solenoid to start scanning the next original. The reverse sensor is turned ON, the reverse motor starts rotating in reverse and the reverse roller rotates in reverse.
After the trailing edge of the original has passed the exit roller, the reverse exit operation is completed.

(15) Completion of scanning operation for front side of next original

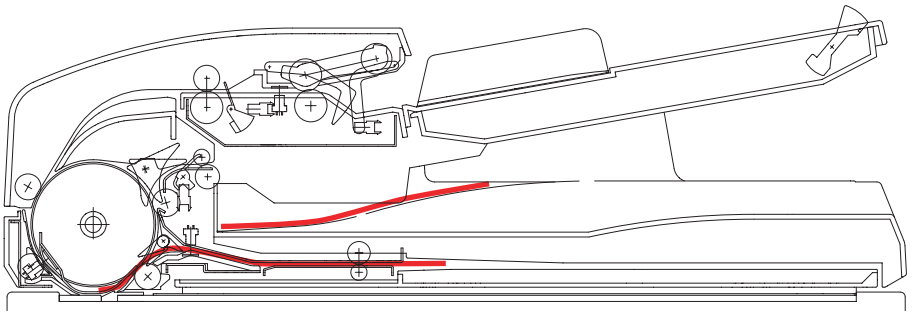


Fig.5-27

When the trailing edge of next original has passed the scanning position, the scanning operation for the front side of the original is completed.
The feed motor starts rotating in reverse and rotates for a certain number of pulses, and then the pickup roller is raised.

(16) Completion of transport operation for the front side of next original (original pausing at reverse position)

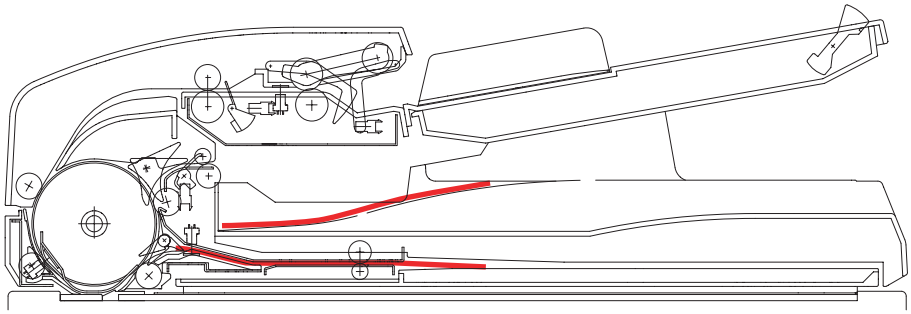


Fig.5-28

The reverse sensor is turned OFF, and then the read motor and reverse motor are stopped to complete the transport operation for the front side of the original.

(17) Start of registration operation for the backside of next original → Completion of registration operation for the backside of next original

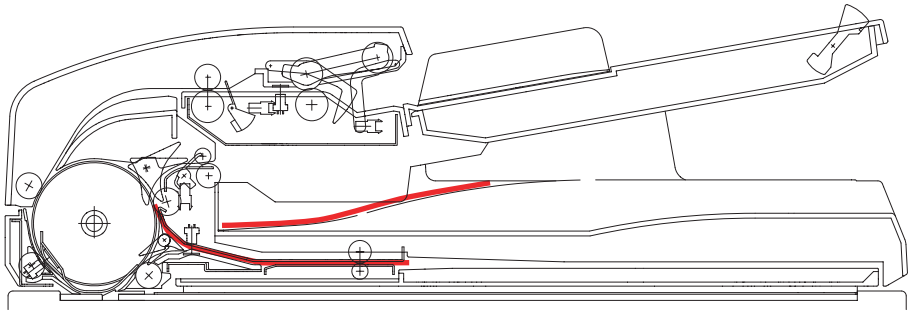


Fig.5-29

The reverse motor starts rotating and the reverse roller rotates in reverse to start the registration operation of the next original (backside) pausing at the reverse position.
The reverse sensor is turned ON and the reverse motor rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(18) Start of reverse feeding operation for next original → Completion of reverse feeding operation for next original

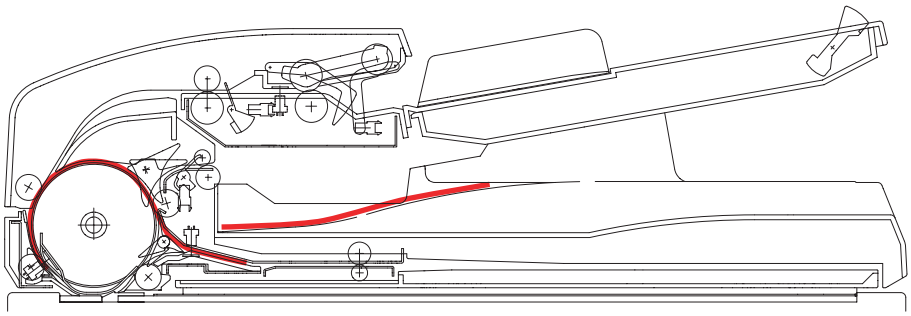


Fig.5-30

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the next original waiting at the back side registration position. The read sensor is turned ON and the read motor and reverse motor rotate for a certain number of pulses, and then both motors stop.
(The leading edge of next original reaches the pre-scanning position for the backside of the original.)

(19) Start of scanning operation for backside of next original → Completion of scanning operation for backside of next original

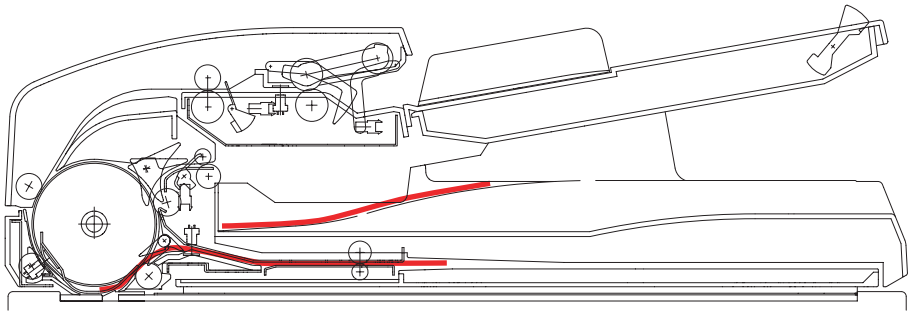


Fig.5-31

The original transport signal is sent from the equipment, the read motor and reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start scanning the backside of next original.
The trailing edge of the original has passed the reverse roller, and the reverse motor rotates for a certain number of pulses, and then the reverse motor pauses. Then the reverse motor starts rotating in reverse and rotates the reverse roller in reverse to be ready for the leading edge of the next original to come into the reverse position. The scanning operation for the backside of the original is completed when the trailing edge of the next original has passed the scanning position.

(20) Completion of transport operation for backside of next original (original pausing at reverse position)

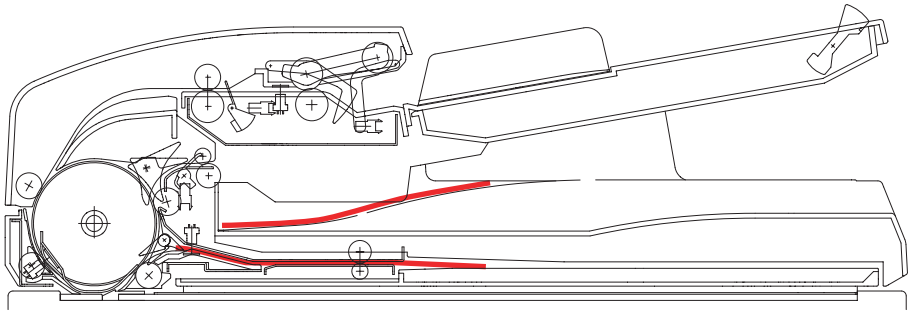


Fig.5-32

The reverse sensor is turned OFF, and the read motor and reverse motor are stopped to complete transporting the backside of the original.
The reverse flapper is switched to the exit side by turning OFF the reverse solenoid.

(21) Start of reverse exit operation of next original → Start of feeding operation for next original → Original length sensor OFF

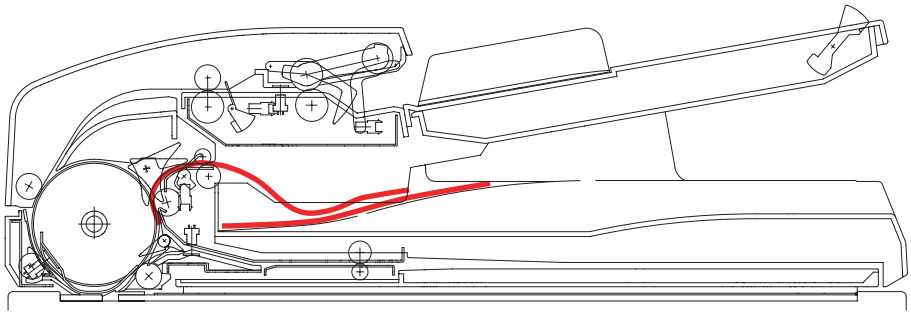


Fig.5-33

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start reverse exit operation of the original pausing at the reverse position.
The reverse motor is stopped after the reverse sensor is turned OFF.
After the exit sensor is turned OFF, read motor rotates for a certain number of pulses until the next original exits completely.

(22) Completion of reverse exit operation for final original

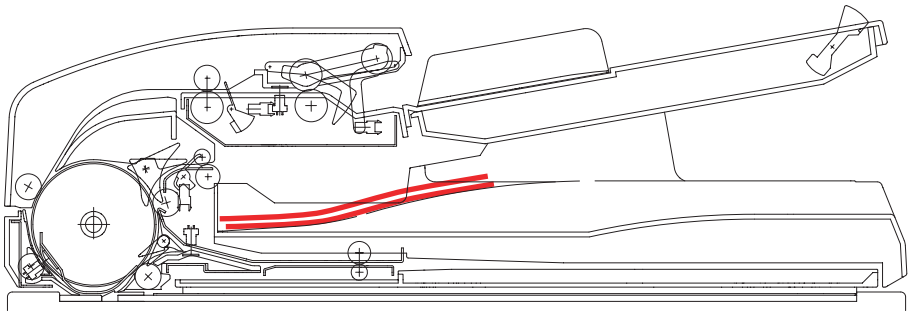


Fig.5-34

The next original exits completely into the original receiving tray, and then the read motor is stopped to complete the reverse paper exit operation.

5.3 Single Side Feeding (for Mixed Sized Originals)

(Mixture of A4-R and FOLIO (LT-R/LG), reproduction ratio 100%)

(1) Setting original

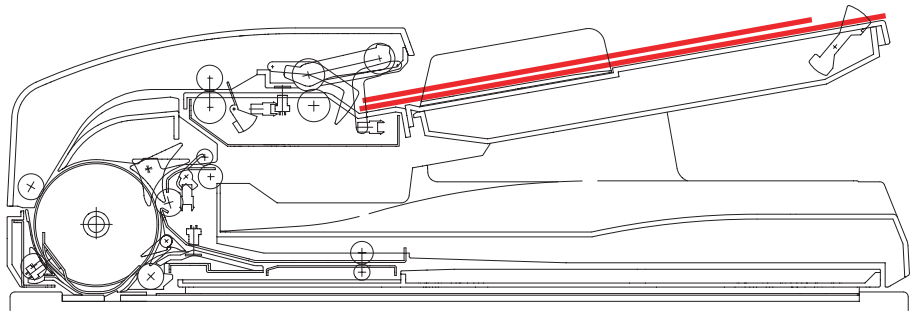


Fig.5-35

The original is set on the tray, the empty sensor is turned ON, and the original set ON signal is sent to the equipment.

(2) Start of pre-feeding operation → Completion of pre-feeding operation

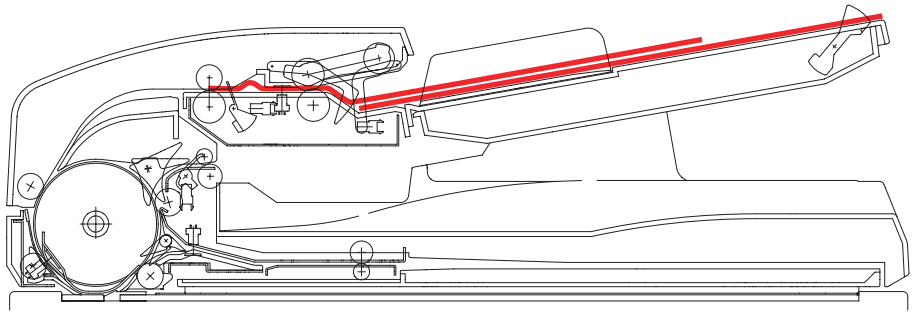


Fig.5-36

A feed signal is sent from the equipment, the feed motor starts rotating forward and rotates the pickup roller and feed roller to start the pre-feeding operation. The registration sensor is turned ON and the registration roller rotates for a certain number of pulses to align the paper, and then the feed motor stops.

(3) Start of feeding operation → Completion of feeding operation

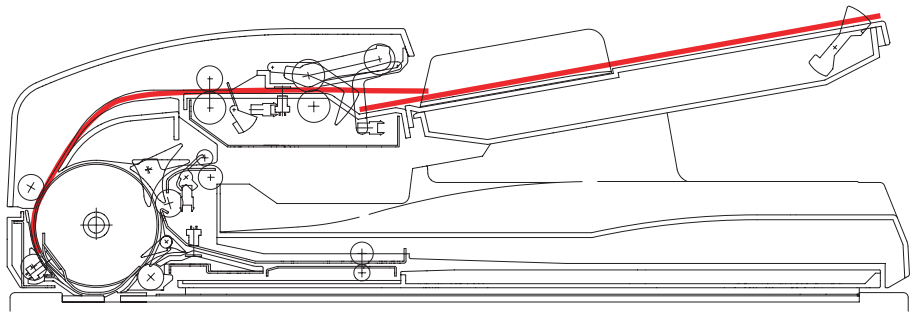


Fig.5-37

The feed motor starts rotating in reverse and the read motor starts rotating forward, and the registration roller, the read roller and exit roller are rotated to start feeding the original waiting at the pre-feeding position. While the pickup roller is raised by rotating the feed motor in reverse, the original shutter is lowered. The read sensor is turned ON and the feed motor and the read motor rotate for a certain number of pulses, and then both motors stop. (Though the leading edge of the original reaches the pre-scanning position, it is transported without scanning because the original size has not been distinguished.)

(4) Start of transport operation → Original length sensor OFF

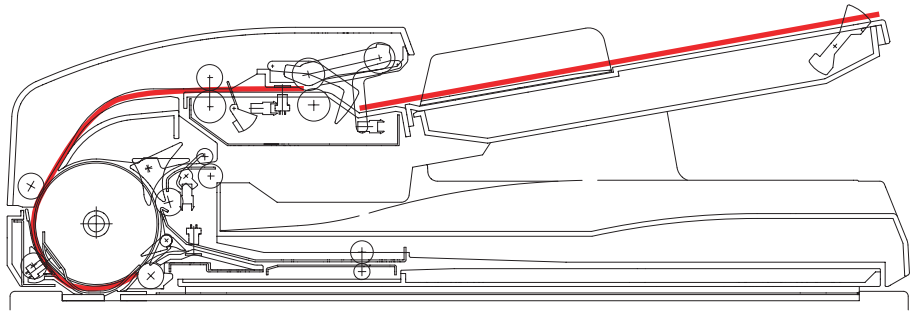


Fig.5-38

The read motor starts rotating forward, the feed motor starts rotating in reverse, and then the read roller, the exit roller and registration roller are rotated. The reverse flapper is switched to the reverse position by turning ON the reverse solenoid to start transporting unscanned original for front side. (The original is transported to determine its lengthwise size along the feeding direction.)
The reverse sensor is turned ON, and then the reverse motor starts rotating in reverse and the reverse roller rotates in reverse.
The original length sensor is turned OFF to determine the original length.

(5) Original length sensor OFF → Registration sensor OFF → Completion of downswing operation of pickup roller

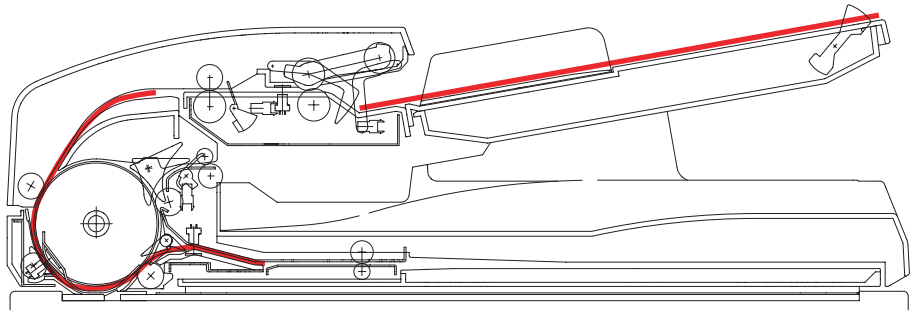


Fig.5-39

The trailing edge of the original turns OFF the registration sensor, and then the feeding motor rotates for a certain number of pulses and stops. The feed motor starts rotating forward and rotates for a certain number of pulses to lower the pickup roller. (The pickup roller waits for the next pre-feeding operation in the lowered position.)

(6) Completion of downswing operation of pickup roller → Completion of transporting unscanned original (front side) in reverse (original pausing at the reverse position)

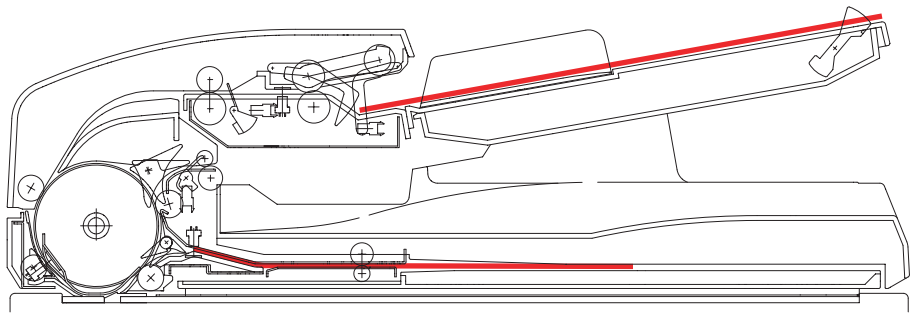


Fig.5-40

The trailing edge of the original being transported without scanning has passed the scanning position and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting the unscanned original (front side).

(7) Start of registration operation for backside of original → Completion of registration operation for backside of original

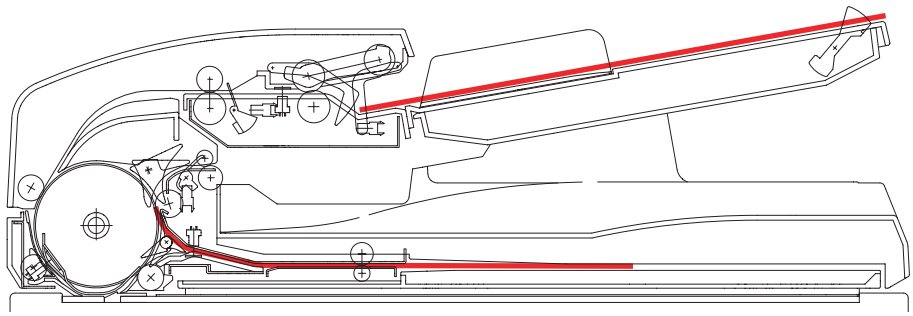


Fig.5-41

The reverse motor starts rotating forward and rotates the reverse roller to start the registration operation for backside of original pausing at the reverse position. The reverse sensor is turned ON and the reverse motor rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(8) Start of reverse feeding operation → Completion of reverse feeding operation

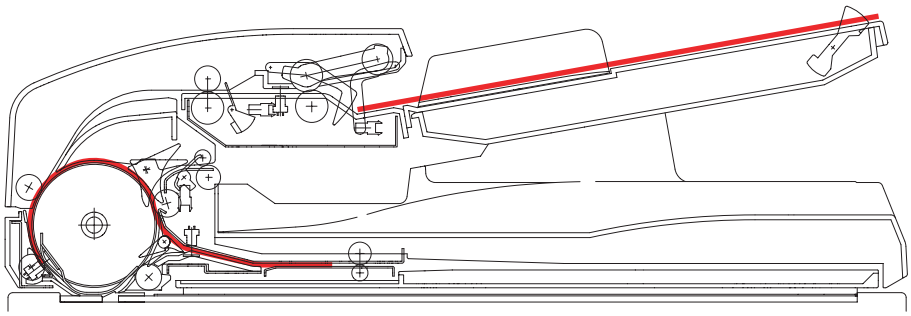


Fig.5-42

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the original waiting at the back side registration position. Though the read sensor is turned ON, transporting the unscanned original (backside) is not stopped.

(9) Start of reverse transporting unscanned original for backside → Passing reverse position → Completion of transporting original for backside (original pausing at the reverse position)

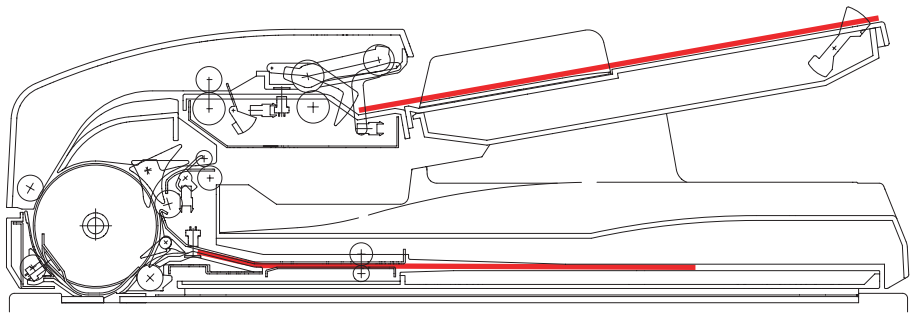


Fig.5-43

The trailing edge of original passes the reverse roller, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. Then the reverse motor starts rotating forward and rotates the reverse roller to be ready for the leading edge of the original to come into the reverse position.
The trailing edge of the original being transported without scanning has passed the scanning position, and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting unscanned original (backside).

(10) Start of front side registration operation in the reverse position → Completion of front side registration in the reverse position

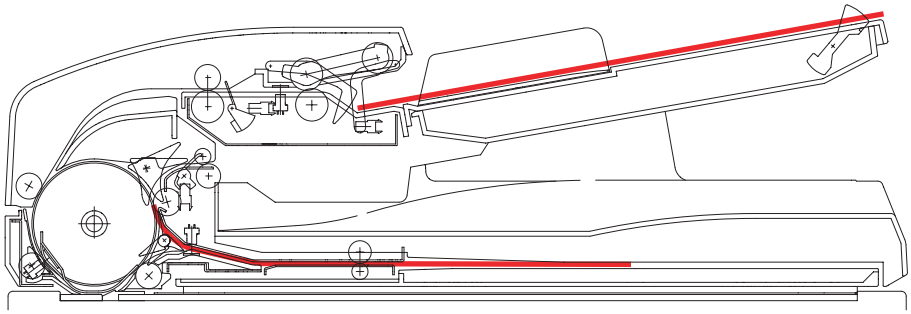


Fig.5-44

The reverse motor starts rotating and rotates the reverse roller in reverse to start the registration operation for the backside of the original pausing at the reverse position.
The reverse sensor is turned ON and the reverse motor rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(11) Start of reverse feeding operation → Completion of reverse feeding operation

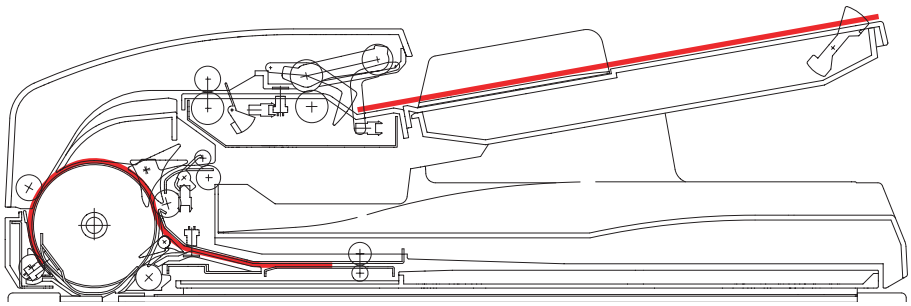


Fig.5-45

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the original waiting at the back side registration position. The read sensor is turned ON, the read motor and reverse motor rotate for a certain number of pulses, and then both motors stop. (The leading edge of the original reaches the start scanning position.)

(12) Start of scanning operation for front side of original → Completion of pre-feeding operation for next original

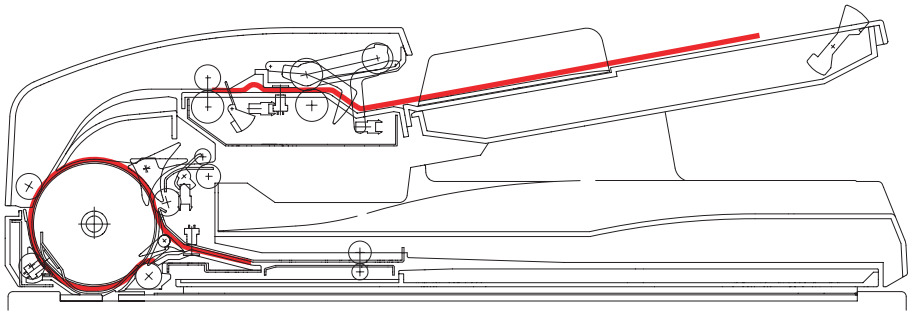


Fig.5-46

The original transport signal is sent from the equipment, and the read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start scanning the original (front side), while the feed motor starts rotating forward and rotate the pickup roller and the feed roller to start the pre-feeding operation for next original. In case of color original, the prefeeding operation for the next original starts after finishing scanning the original.
The trailing edge of original passes the reverse roller, and the reverse motor rotates for a certain number of pulses and then the reverse motor stops. Then the reverse motor starts rotating in reverse and rotates the reverse roller to be ready for the leading edge of the original to come into the reverse position.

(13) Completion of pre-feeding operation → Completion of scanning operation for front side of original

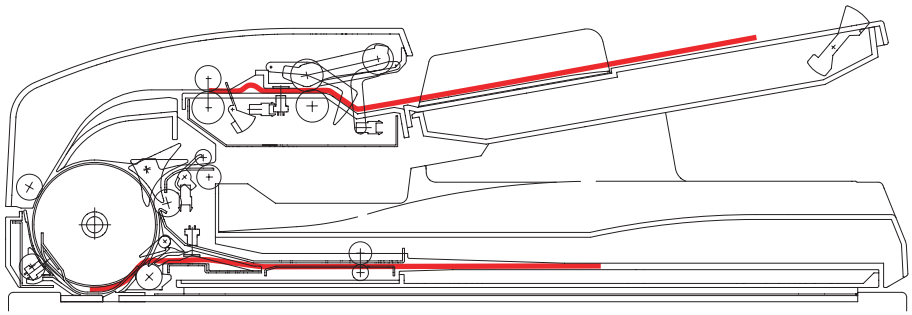


Fig.5-47

The registration sensor is turned ON, and the feed motor rotates for a certain number of pulses, and then the fed motor stops. When the trailing edge of original being scanned has passed the scanning position, the scanning operation (front side) is completed.

(14) Completion of transporting operation for front side (original pausing at reverse position)

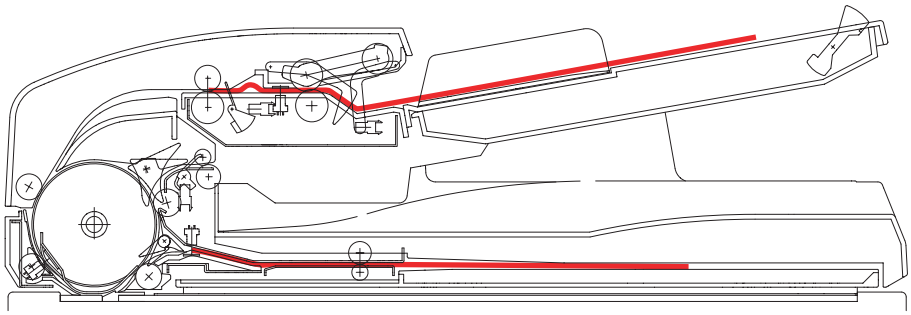


Fig.5-48

The reverse sensor is turned OFF, and the read motor and the reverse motor stop to complete the transporting operation for the front side.

(15) Start of reverse paper exit operation → Read sensor ON

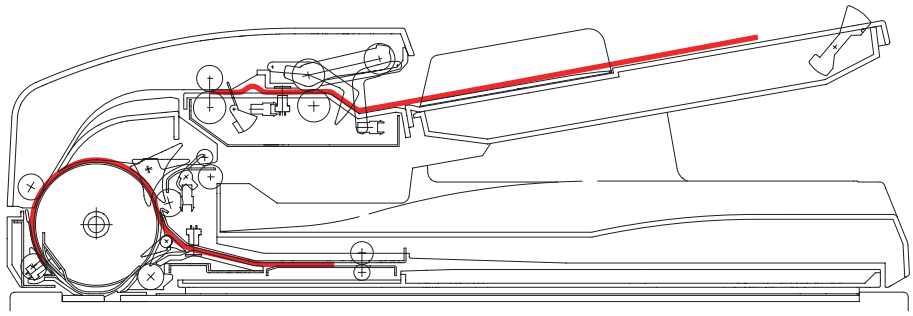


Fig.5-49

The read motor and the reverse motor start rotating, and the read roller, the exit roller and the reverse roller are rotated to detect the original pausing at the reverse position by transporting it without scanning. Though the read sensor is turned ON, transporting the unscanned original is not stopped.

(16) Read sensor ON → Completion of transporting operation for backside of original

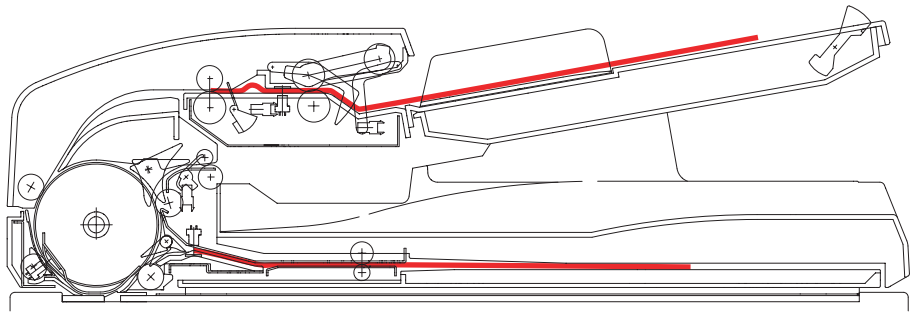


Fig.5-50

The trailing edge of original passes the reverse roller, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. Then the reverse motor starts rotating in reverse and rotates the reverse roller in reverse to be ready for the leading edge of the original to come into the reverse position. The trailing edge of the original being transported without scanning has passed the scanning position and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting unscanned original.
The reverse flapper is switched to the exit side by turning OFF the reverse solenoid.

(17) Start of reverse paper exit operation → Exit sensor OFF → Start of feeding operation for next original

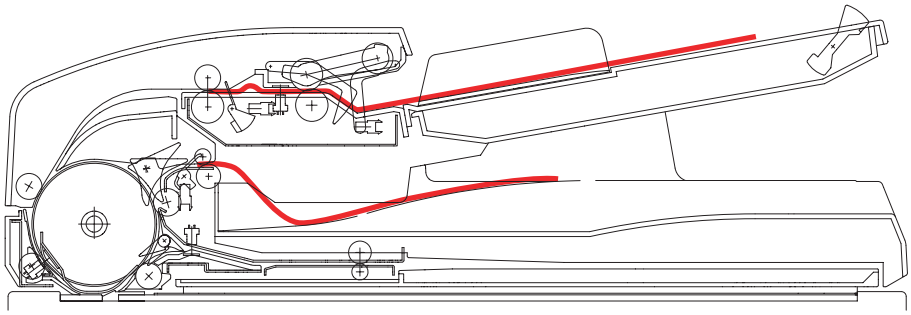


Fig.5-51

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start reverse exit operation of the original pausing at the reverse position. The reverse sensor is turned OFF, and the reverse motor rotates for a certain number of pulse, and then the reverse motor stops. The exit sensor is turned OFF, the feed motor starts rotating in reverse and rotates the registration roller to start the feeding operation of the next original waiting at the pre-feeding position. After the trailing edge of original passes the exit roller, the exit operation is completed.

(18) Completion of feeding operation for the next original

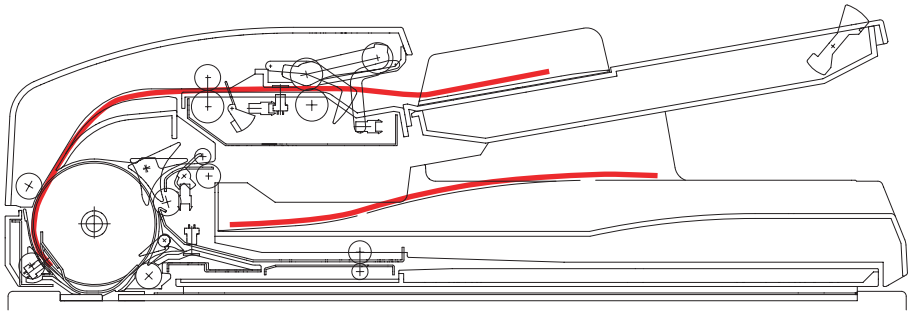


Fig.5-52

The read sensor is turned ON, and the feed motor and the read motor rotate for a certain number of pulses, and then both motors stop.
(Though the leading edge of the original reaches the prescanning position, it is transported without scanning because the original size has not been distinguished.)

(19) Start of transport operation → Original length sensor OFF

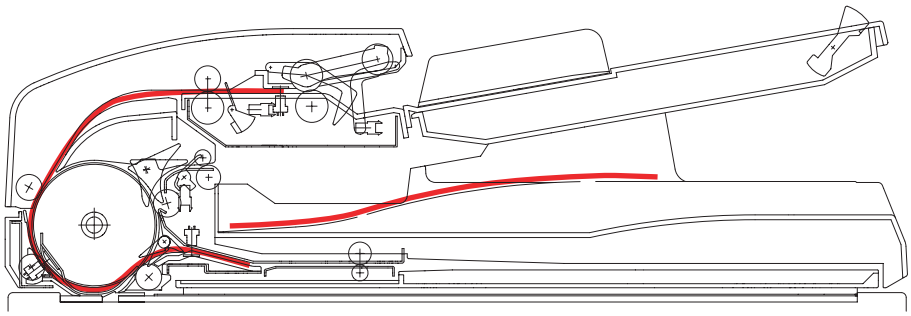


Fig.5-53

The read motor starts rotating forward, the feed motor starts rotating in reverse, and then the read roller, the exit roller and registration roller are rotated. The reverse flapper is switched to the reverse position by turning ON the reverse solenoid to start transporting the next original for front side without scanning. (The original is transported to determine its lengthwise size along the feeding direction.) The reverse sensor is turned ON, and the reverse motor starts rotating in reverse and the reverse roller rotates in reverse.
The original length sensor is turned OFF to determine the original length.

(20) Original length sensor OFF → Completion of transporting unscanned original for front side (original pausing at the reverse position)

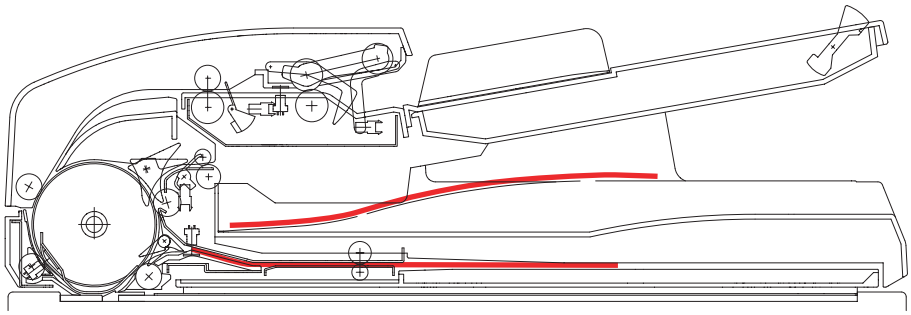


Fig.5-54

The trailing edge of the original turns OFF the registration sensor, and the feeding motor rotates for a certain number of pulses, and then the feed motor stops. Then, the feed motor starts rotating forward and rotates for a certain number of pulses, and then the pickup roller is lowered.
The trailing edge of the next original being transported without scanning has passed the scanning position and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting the unscanned original (front side).

(21) Start of registration operation for backside of original → Completion of registration operation for backside of original

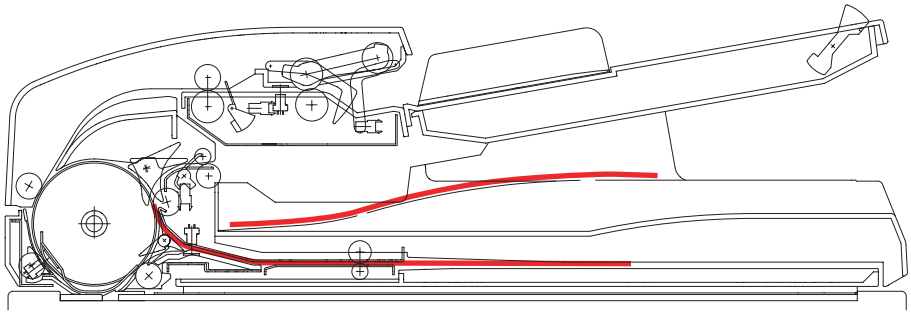


Fig.5-55

The reverse motor starts rotating forward and rotates the reverse roller to start the registration operation for backside of original pausing at the reverse position. The reverse sensor is turned ON, and the reverse motor rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(22) Start of reverse feeding operation → Completion of reverse feeding operation

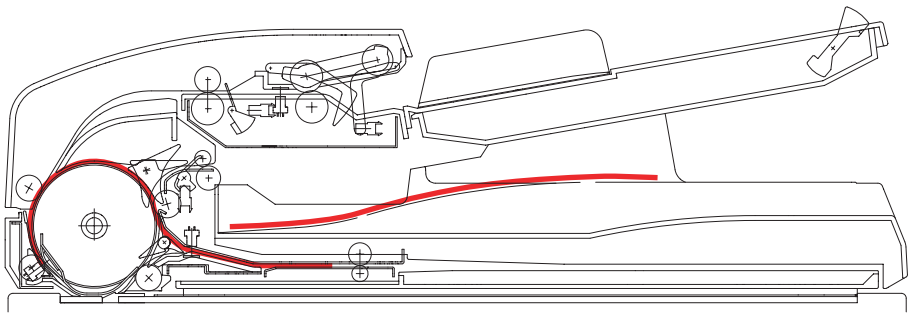


Fig.5-56

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the next original waiting at the back side registration position. Though the read sensor is turned ON, transporting the unscanned original (backside) is not stopped.

(23) Start of reverse transporting unscanned original for backside → Passing reverse position → Completion of transporting original for backside (original pausing at the reverse position)

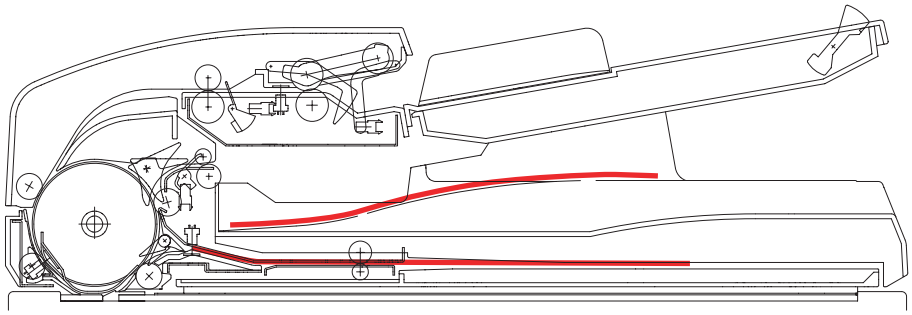


Fig.5-57

The trailing edge of the next original passes the reverse roller, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. Then the reverse motor starts rotating in reverse and rotates the reverse roller to be ready for the leading edge of the next original to come into the reverse position.
The trailing edge of the next original being transported without scanning has passed the scanning position, and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting unscanned original (backside).

(24) Start of front side registration operation in the reverse position → Completion of front side registration in the reverse position

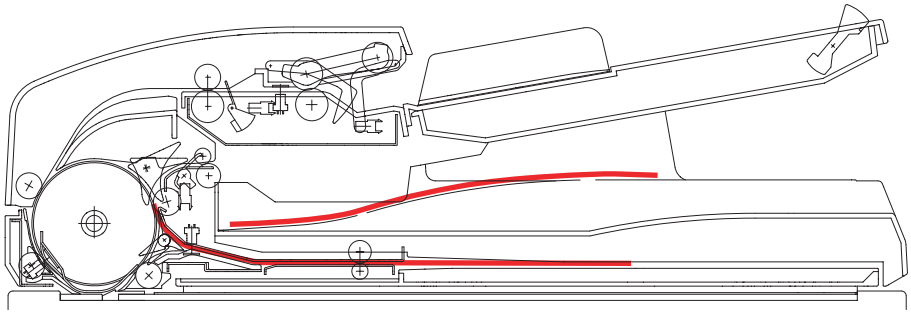


Fig.5-58

The reverse motor starts rotating in reverse and rotates the reverse roller in reverse to start the registration operation for the front side of the next original pausing at the reverse position.
The reverse sensor is turned ON and the registration roller rotates for a certain number of pulses to align the paper, and then the reverse motor stops.

(25) Start of reverse feeding operation → Completion of reverse feeding operation

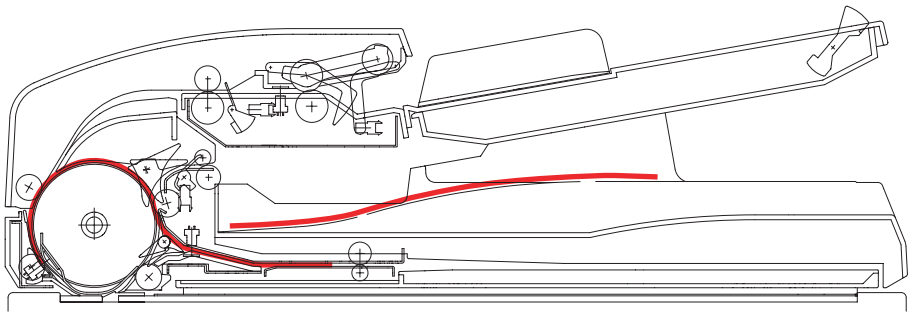


Fig.5-59

The read motor and the reverse motor start rotating, and the read roller, exit roller and reverse roller are rotated to start the reverse feeding operation for the original waiting at the back side registration position. The read sensor is turned ON, the read motor and reverse motor rotate for a certain number of pulses, and then both motor stop. (The leading edge of the next original reaches the pre-back side scanning position.)

(26) Start of scanning operation for front side of original → Completion of scanning operation for front side of original

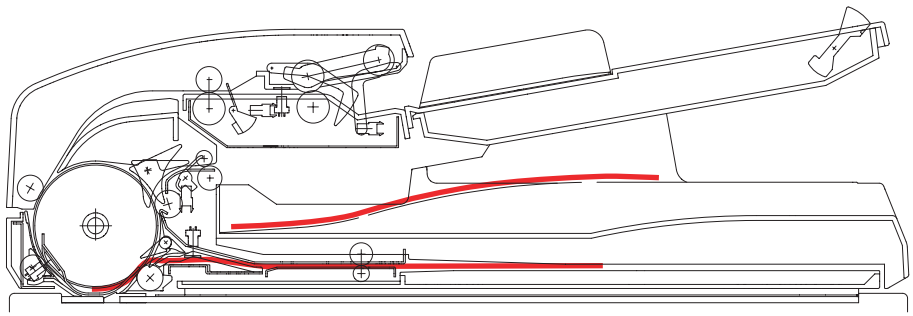


Fig.5-60

The original transport signal is sent from the equipment, and the read motor and the reverse motor starts rotating, and the read roller, exit roller and reverse roller are rotated to start scanning the original (front side). The trailing edge of the next original passes the reverse roller, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. Then the reverse motor starts rotating in reverse and rotates the reverse roller to be ready for the leading edge of the next original to come into the reverse position. When the trailing edge of original being scanned has passed the scanning position, the scanning operation (front side) is completed.

The feed motor starts rotating in reverse and rotates for a certain number of pulses, and then the pickup roller is raised.

(27) Completion of transporting operation for front side (original pausing at reverse position)

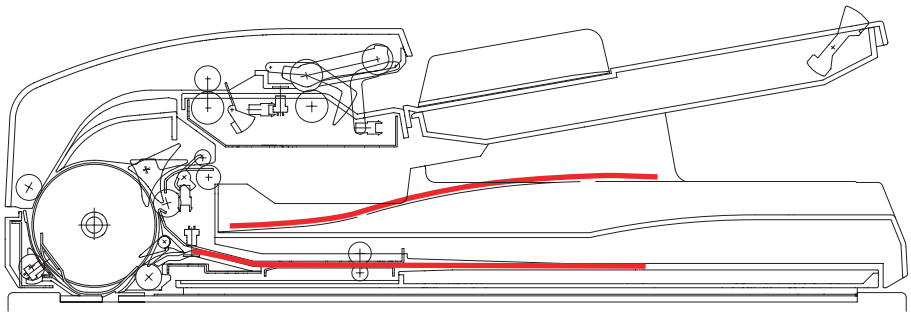


Fig.5-61

The reverse sensor is turned off, and the read motor and the reverse motor stop to complete the transporting operation for the front side.

(28) Start of reverse exit operation → Read sensor ON

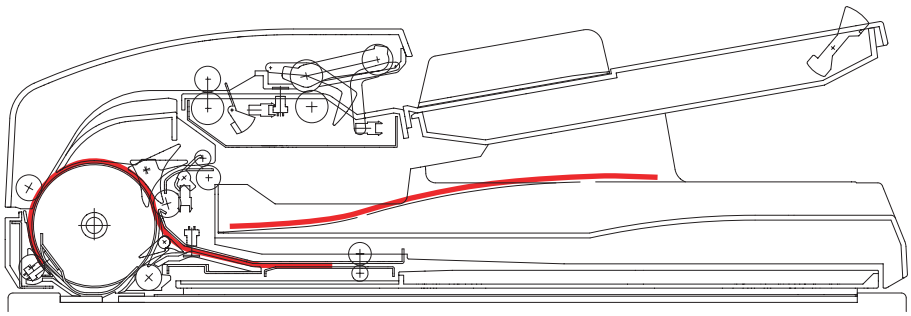


Fig.5-62

The read motor and the reverse motor start rotating, and the read roller, the exit roller and the reverse roller are rotated to exit the original pausing at the reverse position by transporting it without scanning. Though the read sensor is turned ON, transporting the unscanned original is not stopped.

(29) Read sensor ON → Completion of transporting operation for backside of original

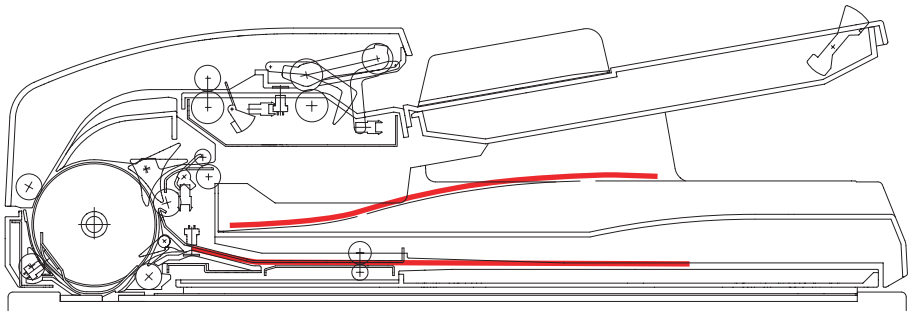


Fig.5-63

The read sensor is turned ON, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. Then the reverse motor starts rotating and rotates the reverse roller to be ready for the leading edge of the original to come into the reverse position. The trailing edge of the original being transported without scanning has passed the scanning position, and the reverse sensor is turned OFF, and then the read motor and the reverse motor stop to complete transporting unscanned original (backside).
The reverse flapper is switched to the exit side by turning OFF the reverse solenoid.

(30) Start of reverse exit operation → Exit sensor OFF

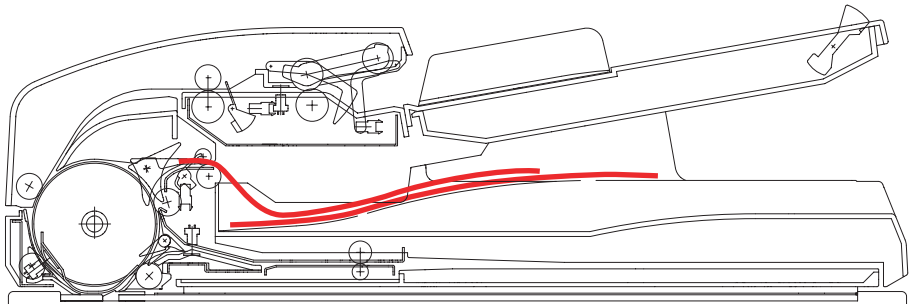


Fig.5-64

The read motor and the reverse motor start rotating, and the read roller and exit roller and reverse roller are rotated to start the reverse exit operation of the next original pausing at the reverse position.
The reverse sensor is turned OFF, and the reverse motor rotates for a certain number of pulses, and then the reverse motor stops. The exit sensor is turned OFF, and the trailing edge of original has passed the exit roller, and then the exit operation is completed.

(31) Completion of reverse exit operation for final original

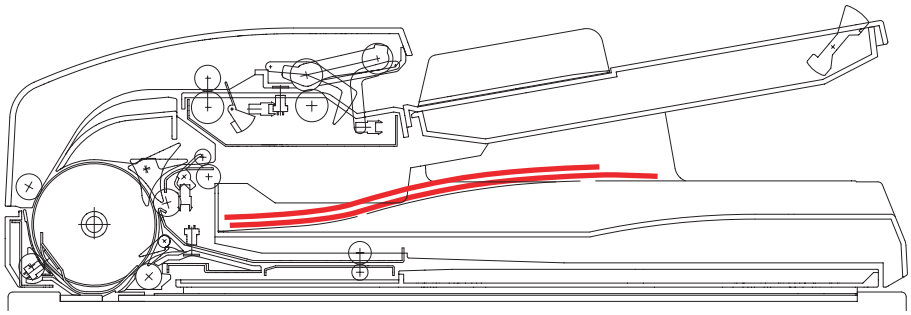


Fig.5-65

When the next original exits completely into the original receiving tray, the read motor is stopped to complete the reverse paper exit operation.

6. JAMMING

6.1 Feeding Jam

6.1.1 Not reaching original length sensor

* Jam detection
  Jam detection is performed after the feed motor starts to rotate forward to start the pre-feeding operation, until the leading edge of the original has reached the original length sensor.

* Jam timer setting
  The pulse number which is thrice the amount of transport time after the original has passed the pickup position (empty sensor shows paper is still present), until it turns ON the registration sensor is set as the jam timer setting value.

6.1.2 Not reaching registration sensor

* Jam detection
  Jam detection is performed after the leading edge of the original has reached the original length sensor to start pre-feeding operation, until it reaches the registration sensor.

* Jam timer setting
  The pulse number which is an added +60 mm to the transport distance to the original length sensor ON position is set as the jam timer setting value.

6.2 Transport Jam

6.2.1 Stop jam at the original length sensor

* Jam detection
  [Other than personal check]
  Jam detection is performed after the feed motor starts to rotate reversely to transport the original from the registration roller to the read roller, until the trailing edge of the original has passed the original length sensor.

  [Personal check]
  The value is not set since it does not pass the original length sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance until the longest-sized original (LD) has passed the original length sensor is set as the jam pulse.

6.2.2 Stop jam at the registration sensor

* Jam detection
  [Other than personal check]
  Jam detection is performed after the trailing edge of original has passed the original length sensor, until it has passed the registration sensor.

  [Personal check]
  Jam detection is performed after the feed motor starts to rotate reversely to transport the original from the registration roller to the read roller, until the trailing edge of the original has passed the registration sensor.

* Jam pulse setting
  [Other than personal check]
  The setting value of an added +60 mm to the distance from the original length sensor OFF position to the registration sensor OFF position is set as the jam pulse.

  [Personal check]
  The setting value of an added +60 mm to the distance until the longest-sized original (LD) has passed the original length sensor is set as the jam pulse.

6.2.3 Not reaching the read sensor

* Jam detection for single-sided/double-sided originals
  Jam detection is performed after the leading edge of original has reached the 1st small roller of the read roller during the pre-feeding operation, until it reaches to the read sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance from the 1st small roller of the read roller to the read sensor ON position is set as the jam pulse.

6.2.4 Stop jam at the read sensor-1

* Jam detection
  Jam detection is performed after the trailing edge of original has reached the 1st small roller of the read roller during the paper feeding operation, until it has passed to the read sensor.

* Jam pulse setting
  The setting value of an added +30 mm to the distance from the 1st small roller of the read roller to the read sensor OFF position is set as the jam pulse.

6.2.5 Stop jam at the read sensor-2

* Jam detection for double-sided originals
  Jam detection is performed after the read motor starts to rotate forward to start scanning at the scanning
  waiting position, until the trailing edge of original has passed to the read sensor.

* Jam pulse setting
  The setting value of an added +30 mm to the distance until the longest-sized original (LD) has passed the read sensor is set as the jam pulse.

6.2.6 Not reaching the exit sensor-1

* Jam detection
  Jam detection is performed after the leading edge of original has reached the 4th small roller of the read roller, until it reaches to the exit sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance from the 4th small roller of the read roller to the exit sensor ON position is set as the jam pulse.

6.2.7 Not reaching the reverse sensor-1

* Jam detection
  Jam detection is performed after the leading edge of original has reached the 3rd small roller of the read roller, until it reaches to the reverse sensor.

* Jam pulse setting
  The setting value of an added +30 mm to the distance from the 3rd small roller of the read roller to the reverse sensor ON position is set as the jam pulse.

6.3 Exit Jam

6.3.1 Stop jam at the exit sensor

* Jam detection
  Jam detection is performed after the trailing edge of original has reached the 4th small roller of the read roller, until it has passed to the exit sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance from the 4th small roller of the read roller to the exit sensor OFF position is set as the jam pulse.

6.4 Reversing Jam

6.4.1 Not reaching the exit sensor-2

* Jam detection
  Jam detection is performed after the leading edge of original has reached the 4th small roller of the read roller, until it reaches to the exit sensor.

* Jam pulse setting
  The setting value of an added + 60 mm to the distance from the 4th small roller of the read roller to the exit sensor ON position is set as the jam pulse.

6.4.2 Not reaching the reverse sensor-2

* Jam detection for double-sided originals
  Jam detection is performed after the reverse motor starts to rotate reversely to start the reverse feeding operation for the original paused at the reverse position, until the leading edge of the original reaches the reverse sensor.

* Jam pulse setting
  The setting value of an added + 60 mm to the distance from the pre-reverse position to the reverse sensor ON position is set as the jam pulse.

6.4.3 Stop at the reverse sensor-1

* Jam detection for double-sided originals
  Jam detection is performed after the trailing edge of original finished scanning has passed the 3rd small roller of the read roller, until it has passed the reverse sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance from the 3rd small roller of the read roller to the reverse sensor OFF position is set as the jam pulse.

6.4.4 Stop at the reverse sensor-2

* Jam detection for double-sided originals
  Jam detection is performed after the leading edge of the original paused at the reverse position has reached the reverse sensor during the reverse exit operation, until the trailing edge of the original has passed the reverse sensor.

* Jam pulse setting
  The setting value of an added +60 mm to the distance until the longest-sized original (LD) has passed the reverse sensor is set as the jam pulse.

6.5 Error

6.5.1 Types of error detection

1) Original length sensor adjustment error
2) Read sensor adjustment error
3) Reverse sensor adjustment error
4) EEPROM error
5) Fan motor lock error

6.5.2 Adjustment error of sensors

(Original length sensor adjustment error, read sensor adjustment error and reverse sensor adjustment error)

* Error detection
When A/D input voltage of each sensor is from 3.16 V to 3.55 V (no paper), the corresponding D/A output voltage is adjusted to be from 0.04 V to 2.90 V. If this input/output condition is not satisfied, an error occurs on each sensor.

6.5.3 EEPROM error

* Error detection
An error occurs;
- When the default value is failed to be written on the EEPROM at initialization and all-sensor adjustment with the test codes.
- When the data is not read from the EEPROM at power-ON

6.5.4 Fan motor lock error

* Error detection
The lock detection timer (2 sec.) is set when the fan motor starts rotating, and the lock detection signals input from the fan motor is checked at the intervals of 5 msec. If the fan motor is not locked, the setting of the lock detection timer is cleared. The lock is detected as an error if the locked status is detected for more than 2 seconds even though the fan motor is being driven.

6.6 Display on LED

1) The LED is mounted on the PC board. The status of RADF is displayed on the LED.
   - LED position

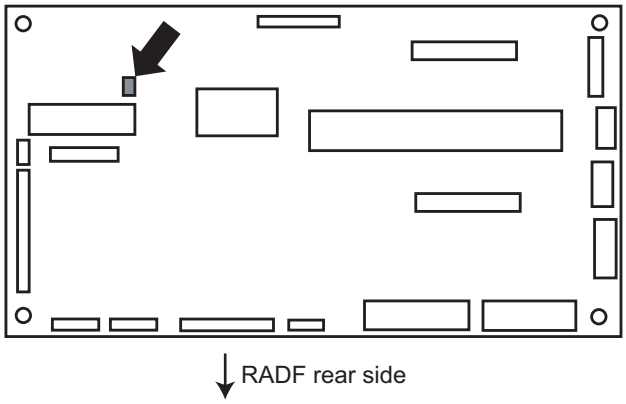


Fig.6-1

2) There are two types of LED display as follows:
   - At rewriting of the Flash ROM
   - At normal operation

3) Flow chart of LED display

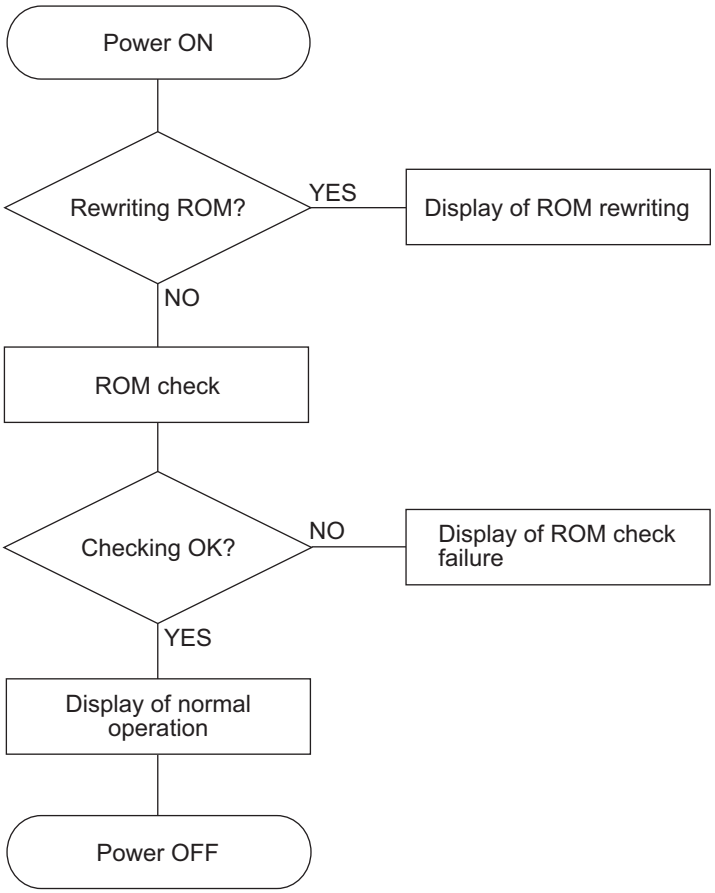


Fig.6-2

- Displays when rewriting ROM.

Period of LED ON/OFF	Contents
LED ON → 500 ms/500 ms	Turns ON when connection of the download jig is recognized. Blinks at intervals of 500 ms when rewriting is completed.
Other than above	Blinks at any interval except 500 ms when error has occurred.

- Displays when the ROM check is failed.

Period of LED ON/OFF	Contents
500 ms/1500 ms	Displays when the Flash ROM check is failed.

- Displays at normal operation.

Period of LED ON/OFF	Contents
750 ms/750 ms	Ready
Other than above	Blinks at any interval except 750 ms when paper jam or error has occurred.

7. ORIGINAL SIZE DETECTION

The original size is detected on every feeding of original, and data of the original size along the feeding direction and width size are transmitted to the equipment before the scanning starts.

7.1 Method of Original Size Detection (for Normal Operation)

1) Original position reference code

When the paper feeding signal is received, the guide width of the tray is checked and memorized. Even if the guide position is changed during operation, the changed guide width is invalid.

2) Width

When the original waiting at the pre-feeding position has started to be fed and its leading edge has passed the registration roller over 67.2 mm, the size data and the states of the original width sensors -1 and -3 are saved.

3) Size along feeding direction

When the leading edge of original has reached the read sensor and further reached to the deceleration starting position for the scanning waiting position, the original size is judged by the states of the original width sensors -1 and -3 saved previously and ON/OFF state of the original length sensor. Then the original size data are transmitted to the equipment (the size along feeding direction first, then the width).

Original size: LT or smaller

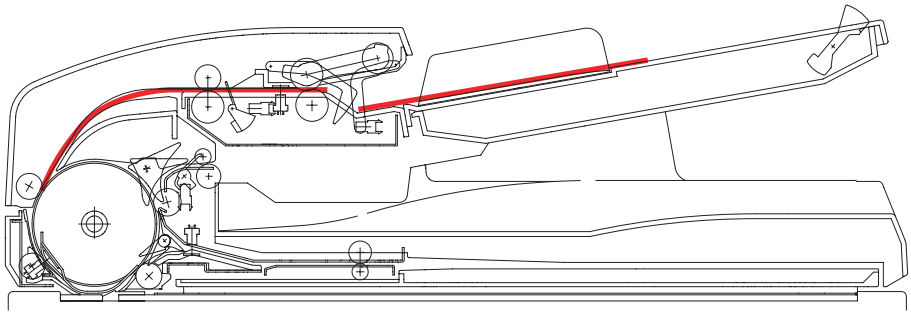


Fig.7-1

2) Timing to determine the paper size in widthwise direction

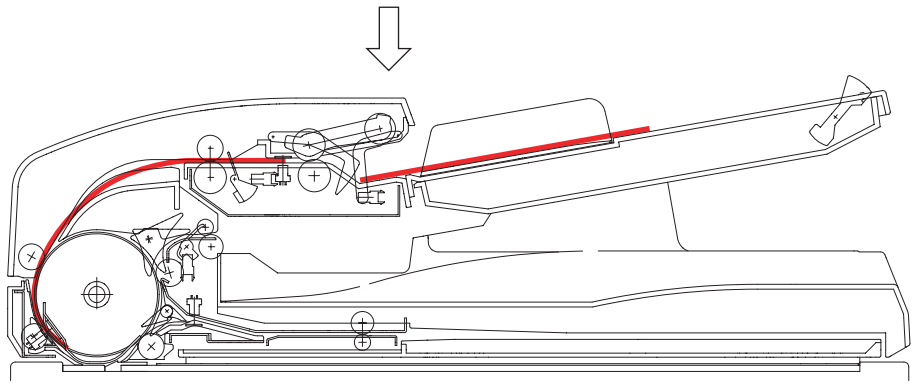


Fig.7-2

3) Timing to determine the paper size in feeding direction

7.2 Method of Original Size Detection (for Mixed Sized Originals)

1) Original position reference code

When the paper feeding signal is received, the guide width of the tray is checked and memorized. Even if the guide position is changed during operation, the changed guide width is invalid.

2) Width

When the original waiting at the pre-feeding position has started to be fed and its leading edge has passed the registration roller over 67.2 mm, the size data and the states of the original width sensors -1 and -3 are saved.

3) Size along feeding direction

When the leading edge of original has reached the read sensor and further reached to the deceleration starting position for the scanning waiting position, the original size is judged by the states of the original width sensors -1 and -3 saved previously and ON/OFF state of the original length sensor. Then the original size data are transmitted (the size along feeding direction first, then the width).
If the original length sensor is ON, however, there are some combinations that the original size cannot be judged. In this case, the original is transported without scanning in reverse to count the feeding motor pulses until its trailing edge has passed the original length sensor. Then the original size is judged by evaluating all these factors and the size data are transmitted to the equipment (the size along feeding direction first, then the width).

Original size: LT or smaller

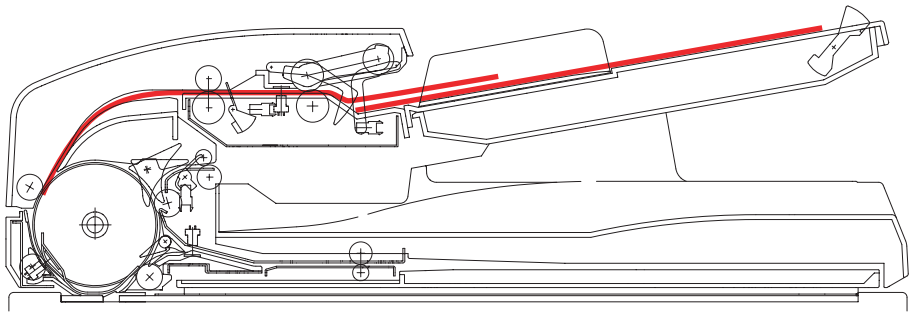


Fig.7-3

2) Timing to determine the paper size in widthwise direction

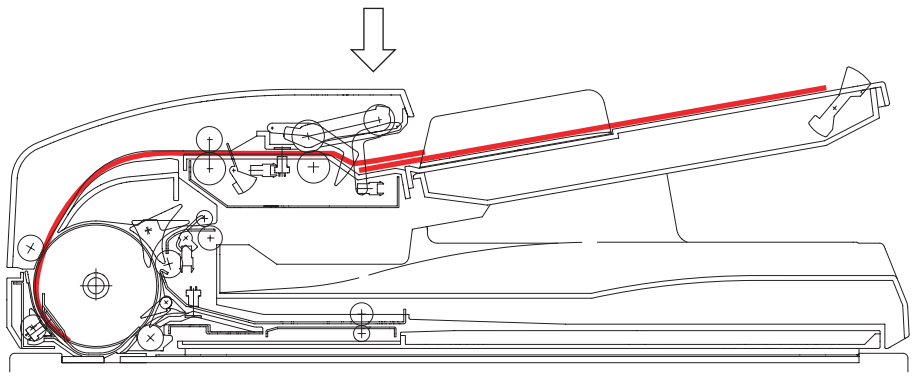


Fig.7-4

3) Timing to determine the paper size in feeding direction

7.3 Relation between Status of Sensor and Original Size

[A4 series]

Judged paper size	Length of original (160 mm or less?)	Detecting the tray guide width when ORG-IN is received (mm)	Result of judging the tray guide width when ORG-IN is received (mm)	Original length sensor at the waiting position of scanning	Size 1 (width: 268.3 mm or more)	Size 3 (width: 196.0 mm or more)
A5-R	NO	114 or less	79			
A5-R		165 or less	148	OFF		
B5-R				ON		
A5-R		196 or less	182	OFF		
B5-R				ON	OFF	OFF
B5-R					OFF	ON
B5-R					ON	
A4		234 or less	210	OFF		
B5-R				ON	OFF	OFF
A4-R					OFF	ON
FOLIO						
A4-R						
FOLIO						
A3						
A4-R						
B5		277 or less	257	OFF		
A4-R				ON	OFF	OFF
FOLIO						
A4-R						
FOLIO						
A3						
A4-R						
B4					OFF	ON
B5		More than 277	297	OFF	OFF	OFF
B5					OFF	ON
A4					ON	
A4-R				ON	OFF	OFF
FOLIO						
A4-R						
FOLIO						
A3						
A4-R						
B4					OFF	ON
A3					ON	
A5-R	YES	114 or less	79			
A4-R		More than 114	148			

Mixed size mode or not	Tray vertical sensor when ORG-IN is received	No switch back	Detecting the length by reverse idling (mm)	Result of judging the length by reverse idling (mm)	(width: 236.55 mm or more)	Judged paper size
						A5-R
						A5-R
						B5-R
						A5-R
						B5-R
						B5-R
						B5-R
						A4
						B5-R
NO	OFF					A4-R
	ON					FOLIO
YES		NO	314 or less	297		A4-R
			357 or less	330		FOLIO
			More than 357	384		A3
		YES				A4-R
						B5
NO	OFF					A4-R
	ON					FOLIO
YES		NO	314 or less	297		A4-R
			357 or less	330		FOLIO
			More than 357	384		A3
		YES				A4-R
						B4
						B5
						B5
						A4
NO	OFF					A4-R
	ON					FOLIO
YES		NO	314 or less	297		A4-R
			357 or less	330		FOLIO
			More than 357	384		A3
		YES				A4-R
						B4
						A3
						A5-R
						A4-R

[LT series]

Judged paper size	Length of original (160 mm or less?)	Detecting the tray guide width when ORG-IN is received (mm)	Result of judging the tray guide width when ORG-IN is received (mm)	Original length sensor at the waiting position of scanning	Size 1 (width: 268.3 mm or more)	Size 3 (width: 196.0 mm or more)
ST-R	NO	110 or less	79			
ST-R		178 or less	140	OFF		
LD				ON		
8.5 x 8.5		237 or less	216	OFF		
LT-R				ON	OFF	OFF
LT-R					OFF	ON
LG						
LT-R						
LG						
LD						
8.5 x 8.5		268 or less	257	OFF	OFF	OFF
8.5 x 8.5					OFF	ON
LT					ON	
LT-R				ON	OFF	OFF
LG						
LT-R						
LG						
LD						
COMP					OFF	ON
8.5 x 8.5		More than 268	279	OFF	OFF	OFF
LT					OFF	ON
LT					ON	
LT-R				ON	OFF	OFF
LG						
LT-R						
LG						
LD						
COMP					OFF	ON
LD					ON	
ST-R	YES	110 or less	79			
LT-R		More than 110	140			

Mixed size mode or not	Tray vertical sensor when ORG-IN is received	No switch back	Detecting the length by reverse idling (mm)	Result of judging the length by reverse idling (mm)	(width: 236.55 mm or more)	Judged paper size
						ST-R
						ST-R
						LD
						8.5 x 8.5
						LT-R
NO	OFF					LT-R
	ON					LG
YES			318 or less	279		LT-R
			394 or less	356		LG
			More than 394	432		LD
						8.5 x 8.5
						8.5 x 8.5
						LT
NO	OFF					LT-R
	ON					LG
YES			318 or less	279		LT-R
			394 or less	356		LG
			More than 394	432		LD
						COMP
						8.5 x 8.5
						LT
						LT
NO	OFF					LT-R
	ON					LG
YES			318 or less	279		LT-R
			394 or less	356		LG
			More than 394	432		LD
						COMP
						LD
						ST-R
						LT-R

8. FLOW CHART

8.1 Power ON Operation - 1

Power ON → Rewriting ROM Data, Communication and Checking Operation

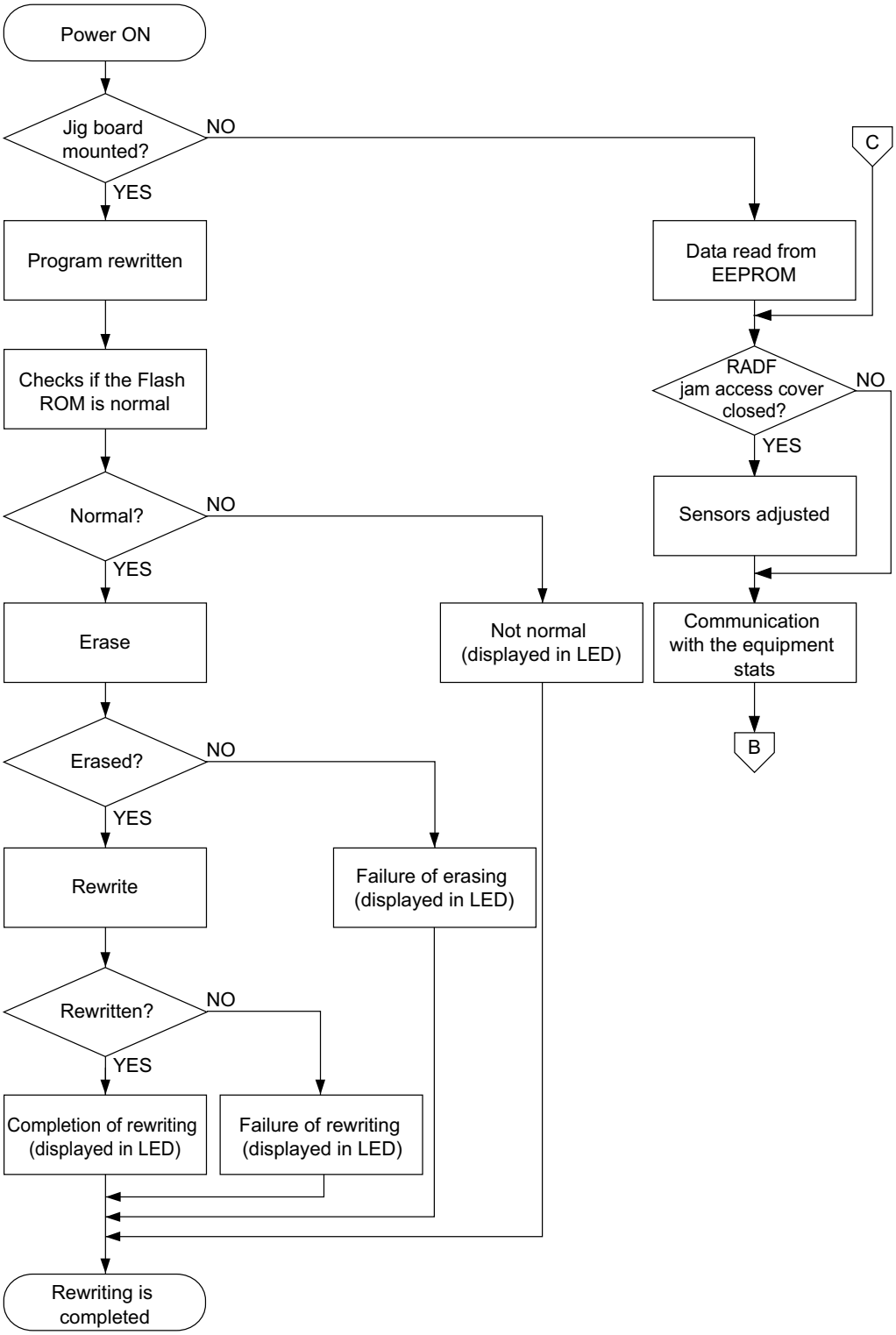


Fig.8-1

8.2 Power ON Operation - 2

Power ON → Rewriting ROM Data, Communication and Checking Operation

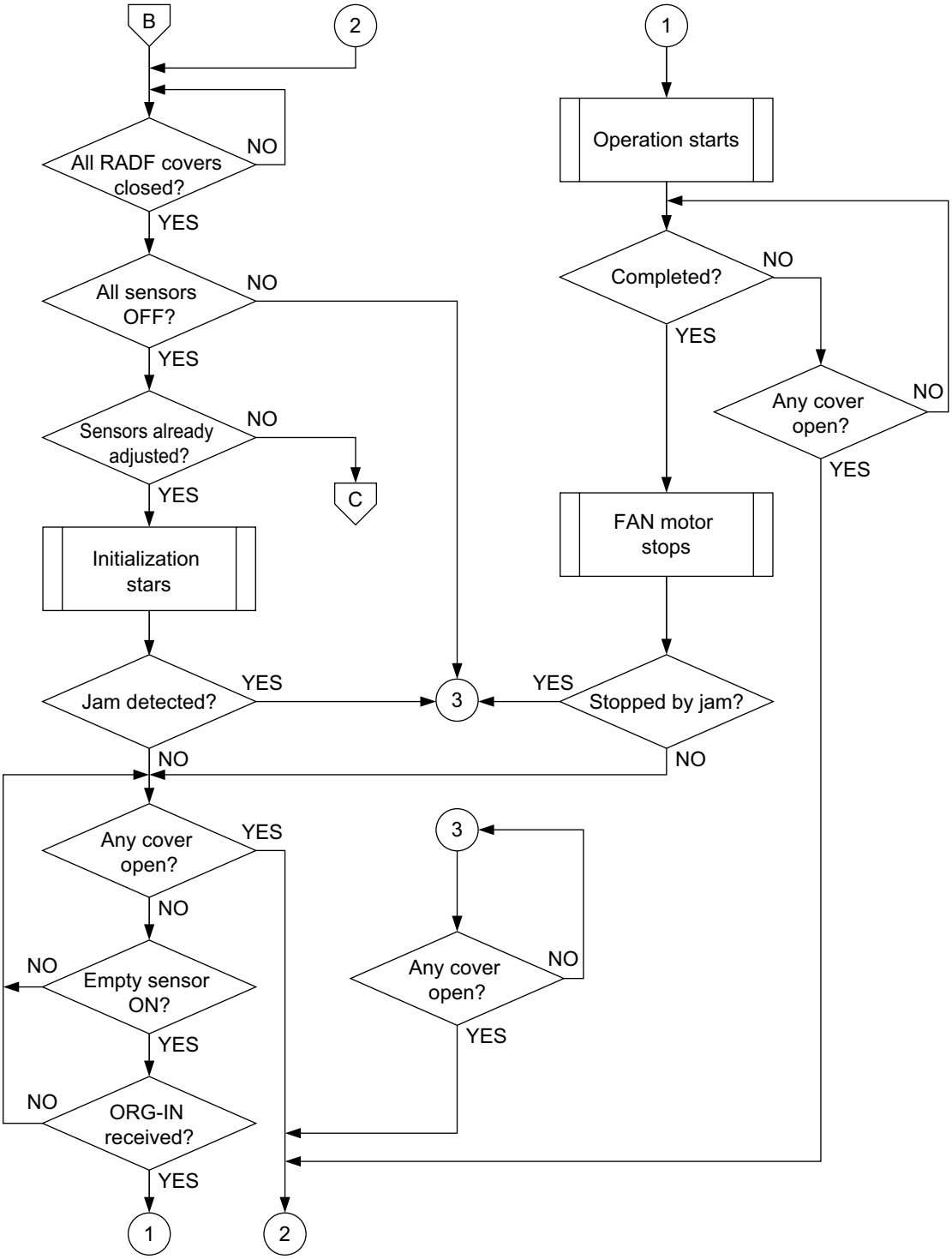


Fig.8-2

8.3 Initialization Operation

Detection of Remained Original and Checking Control from Start to Completion of Operation

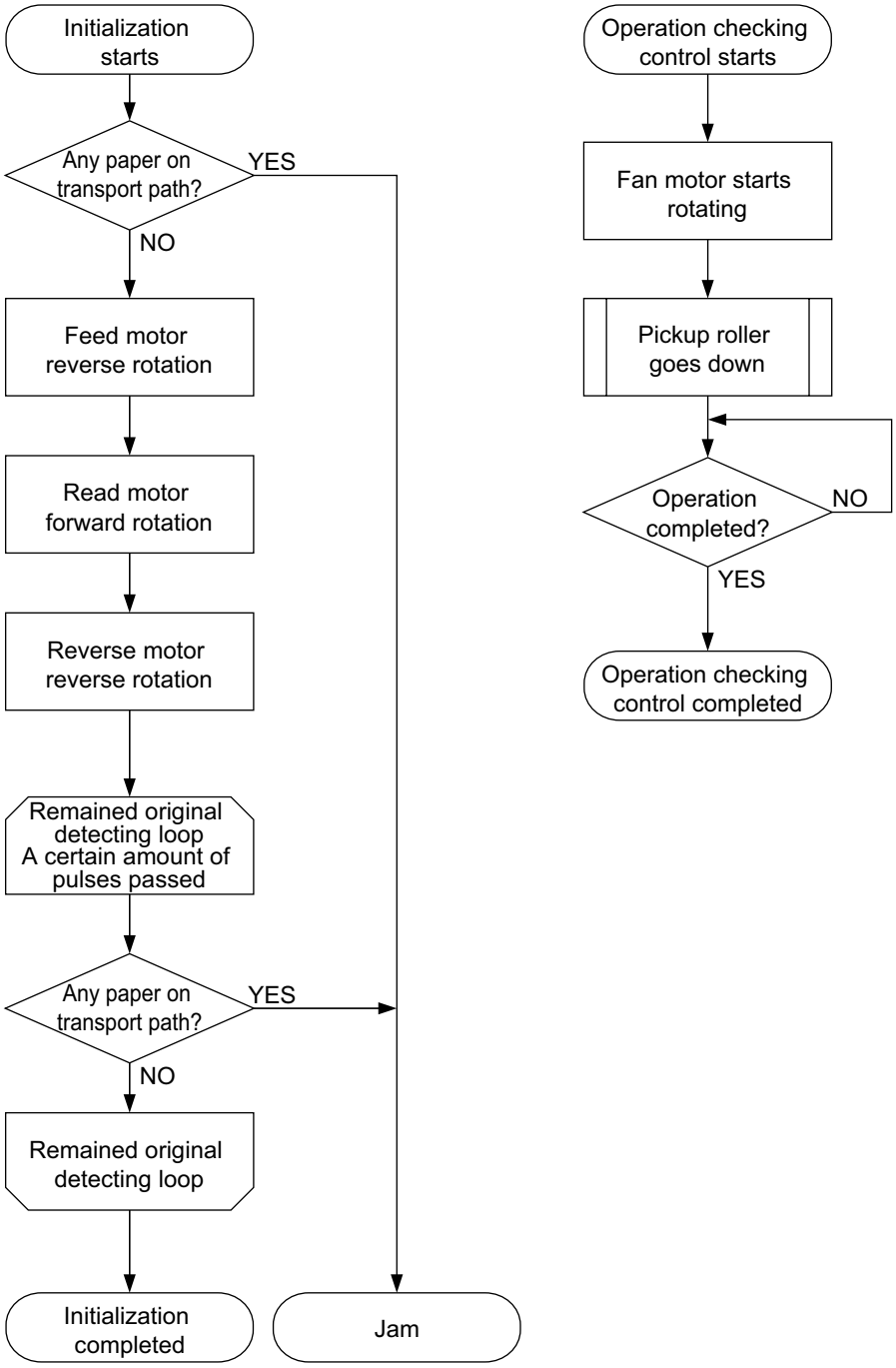
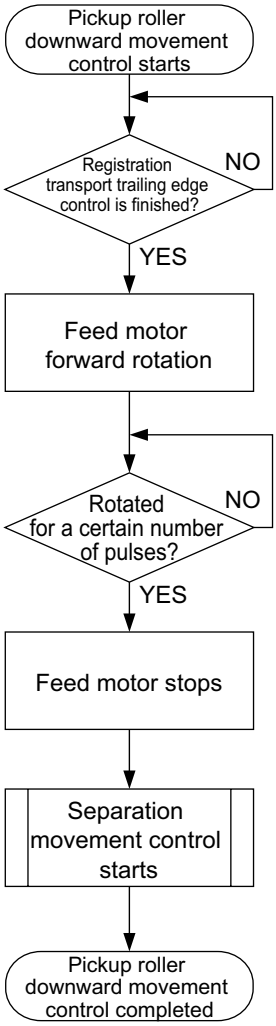


Fig.8-3

8.4 Pickup Roller Downward/Separation Movement Control



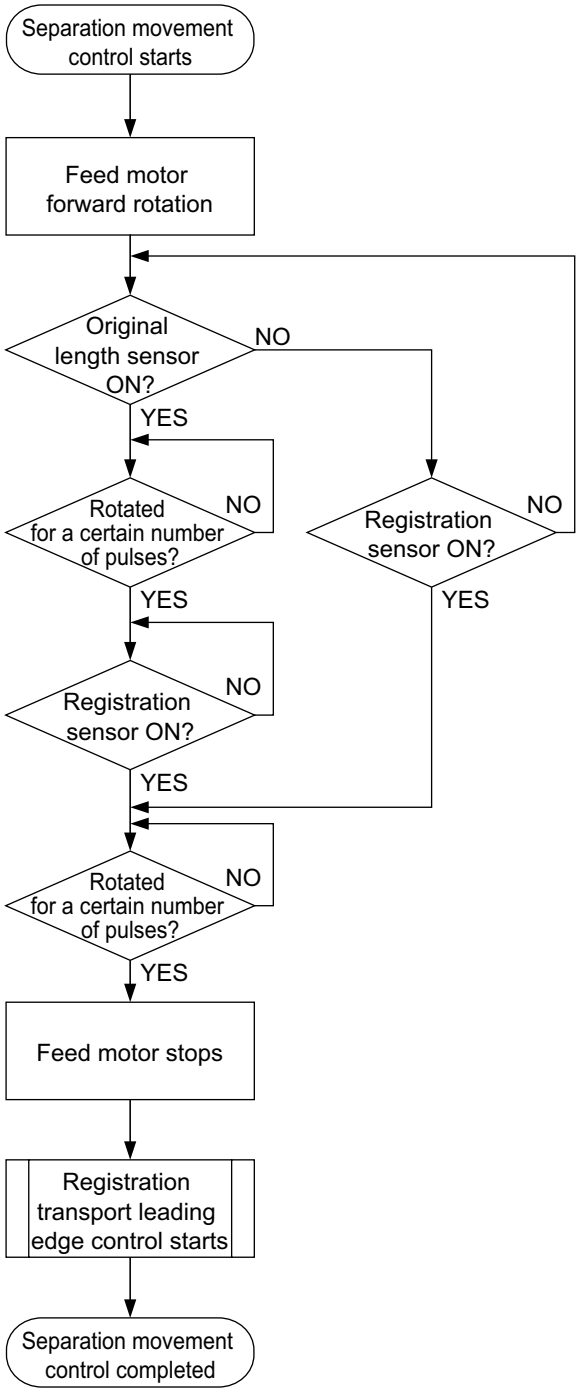


Fig.8-4

8.5 Registration Control - 1

Registration Transport Leading Edge Control

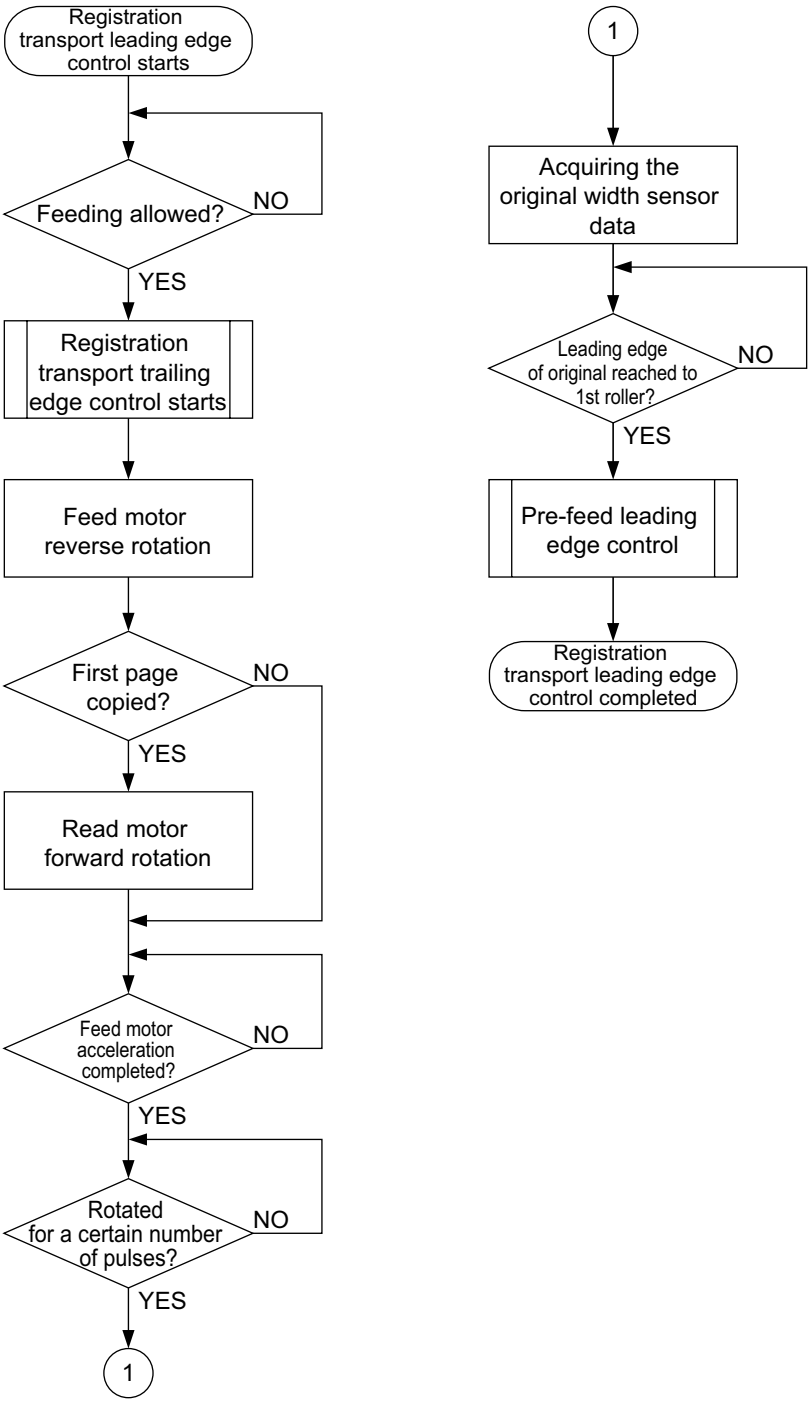


Fig.8-5

8.6 Registration Control - 2

Registration Transport Trailing Edge Control, Pre-Feed Trailing Edge Control

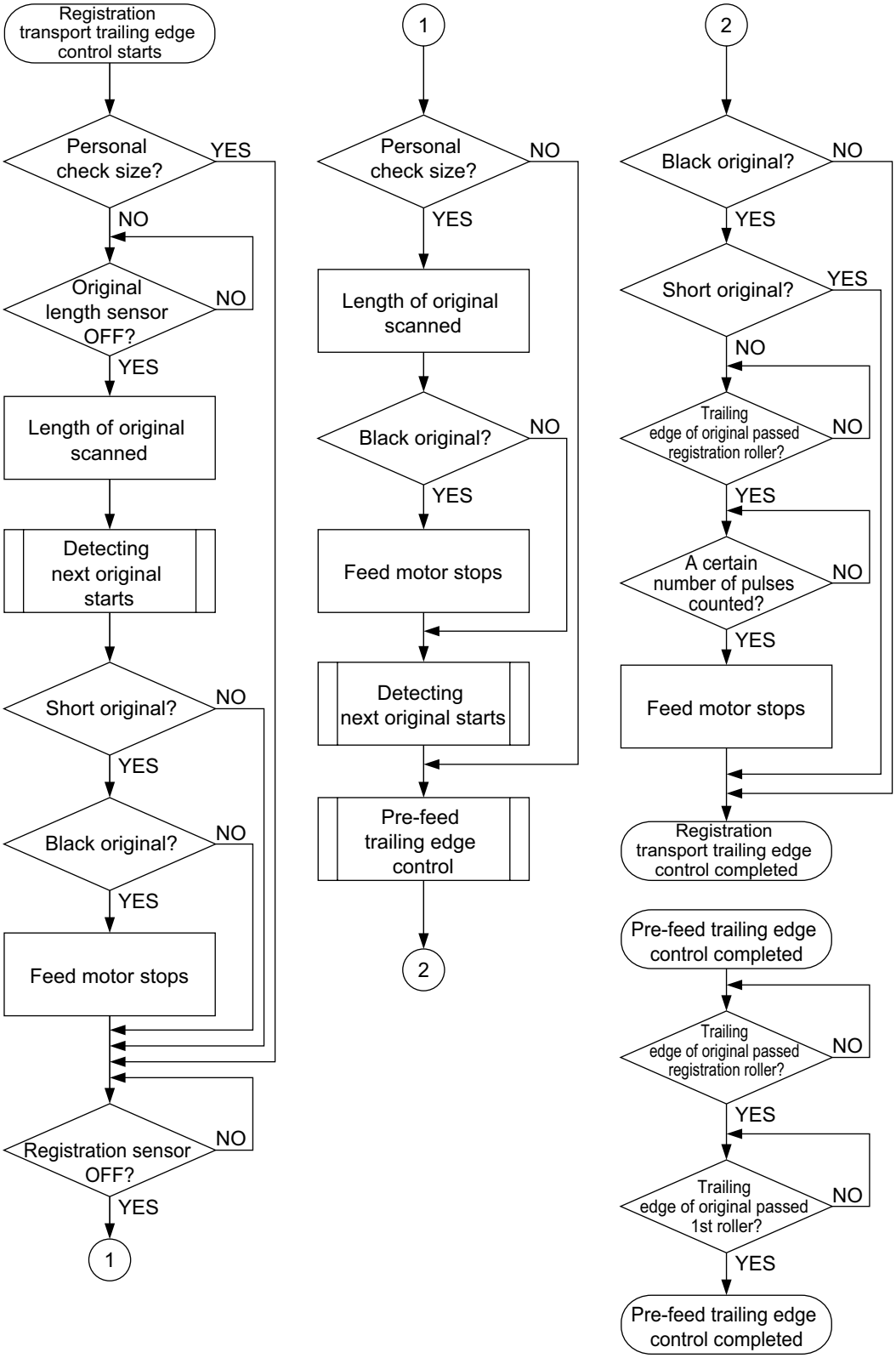


Fig.8-6

8.7 Pre-Feed Leading Edge Control

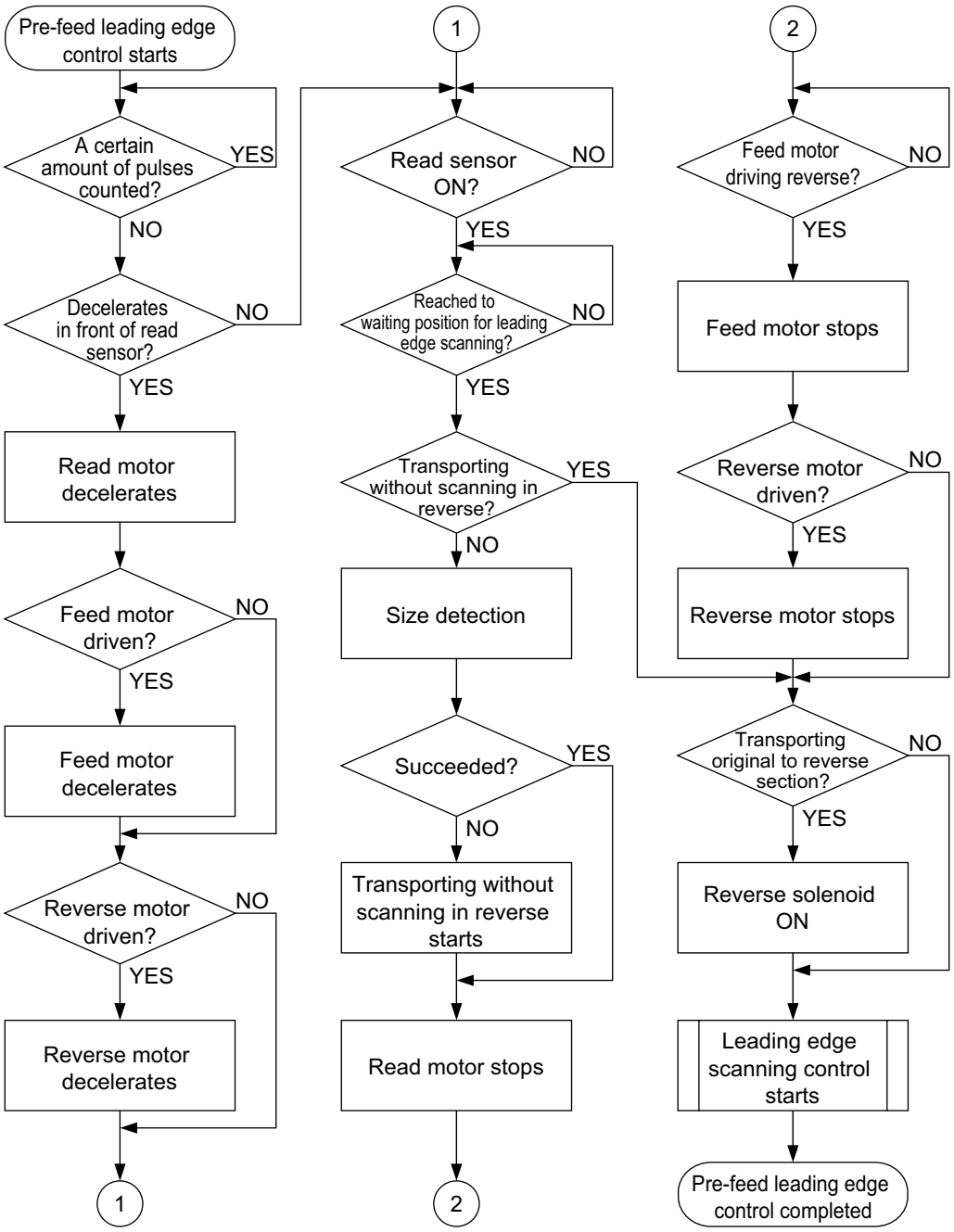


Fig.8-7

8.8 Leading Edge of Original Scanning Control

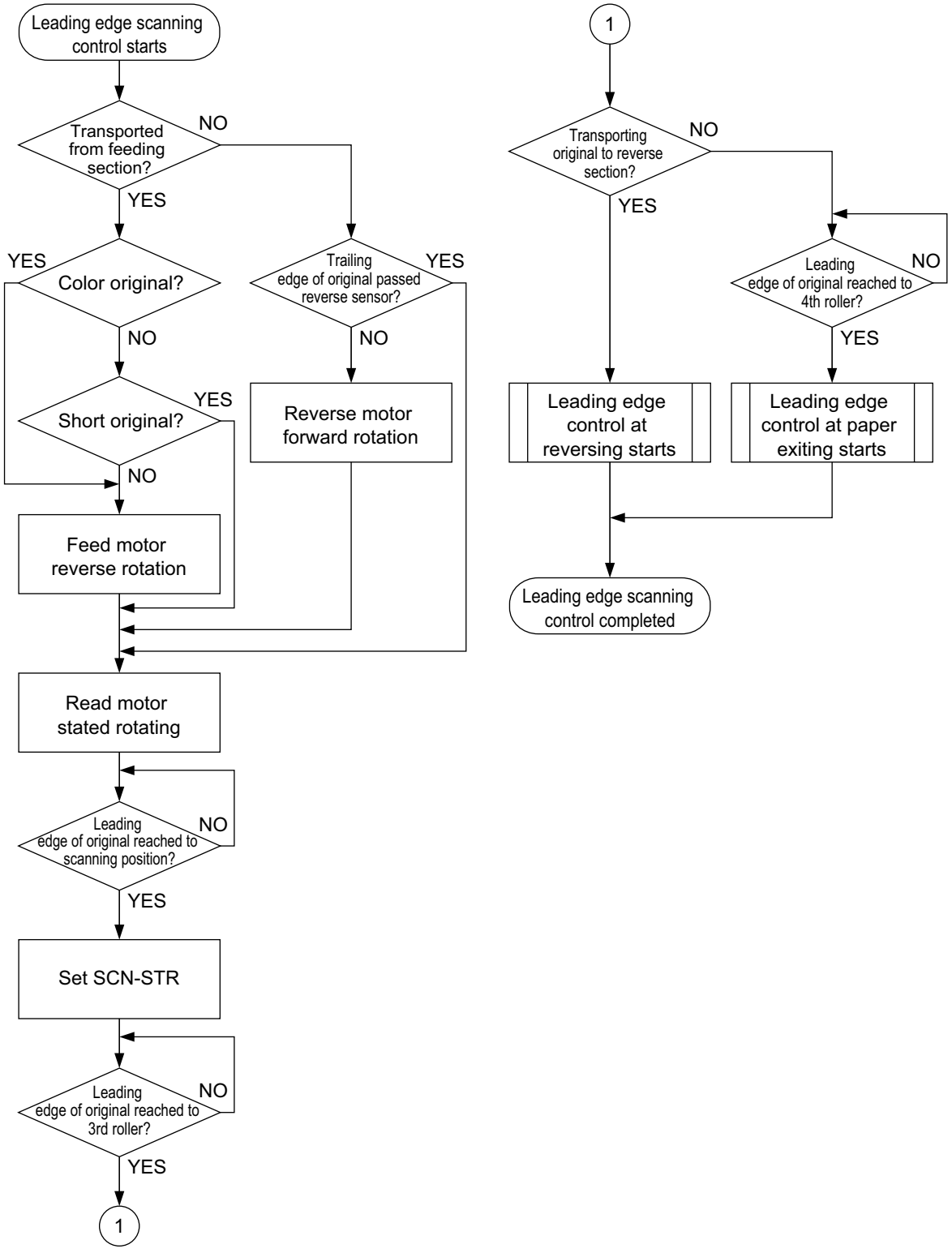


Fig.8-8

8.9 Trailing Edge of Original Scanning Control

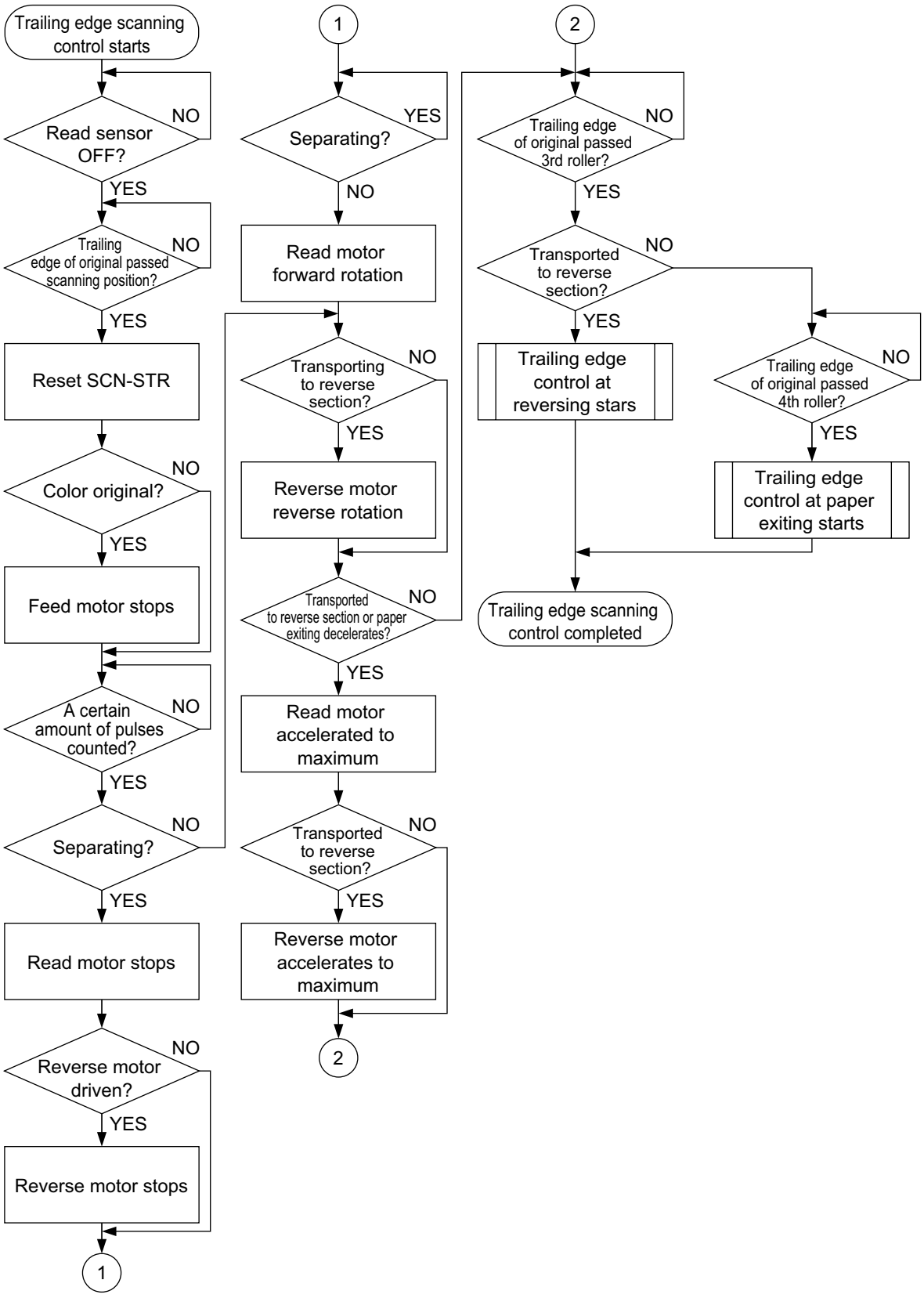


Fig.8-9

8.10 Leading Edge Control at Reversing

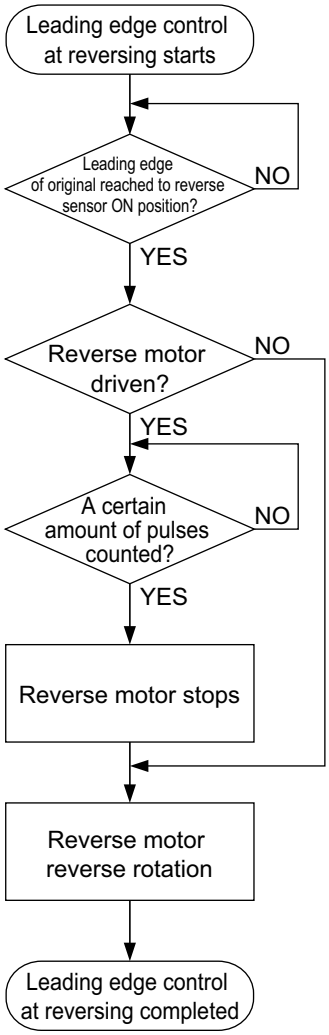


Fig.8-10

8.11 Trailing Edge Control at Reversing

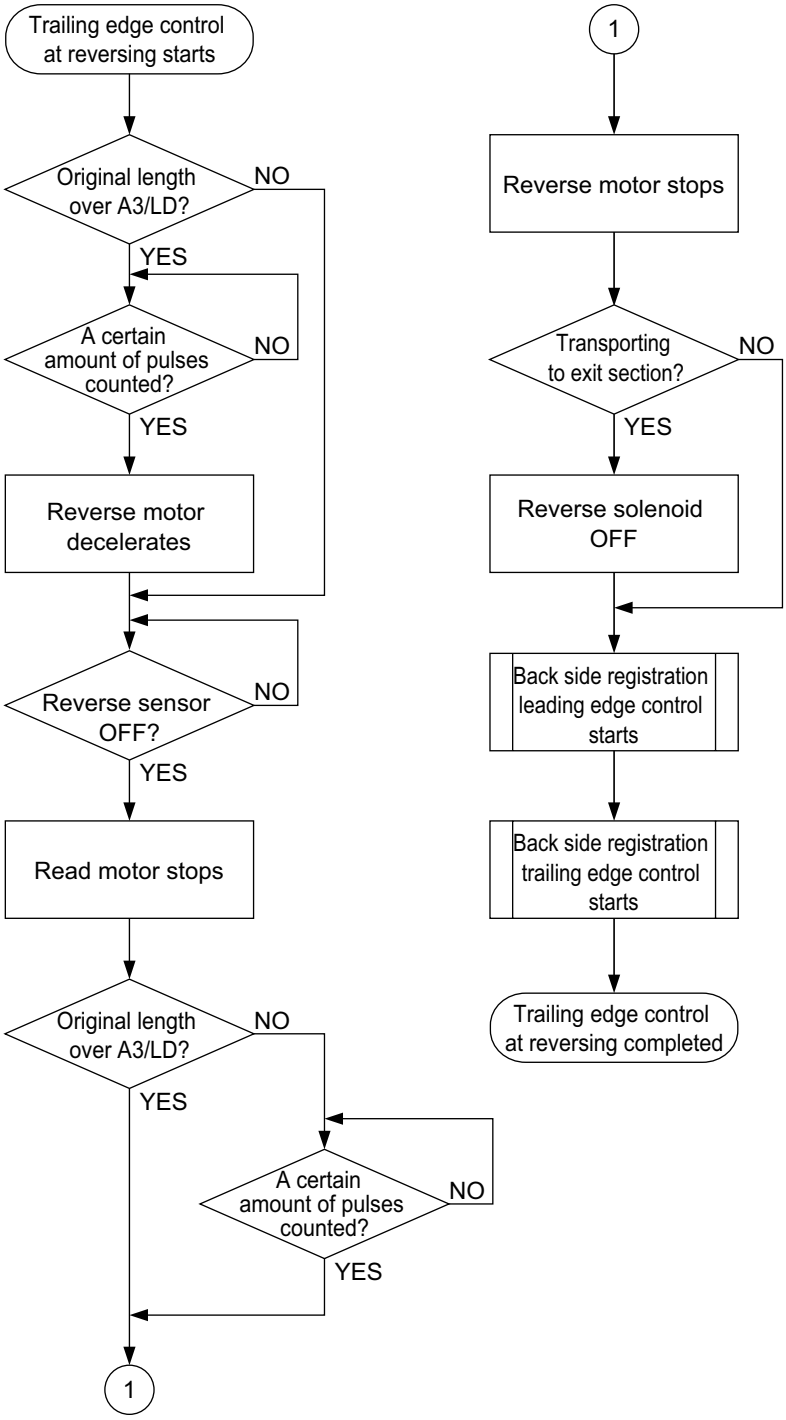


Fig.8-11

8.12 Back Side Registration Leading Edge Control

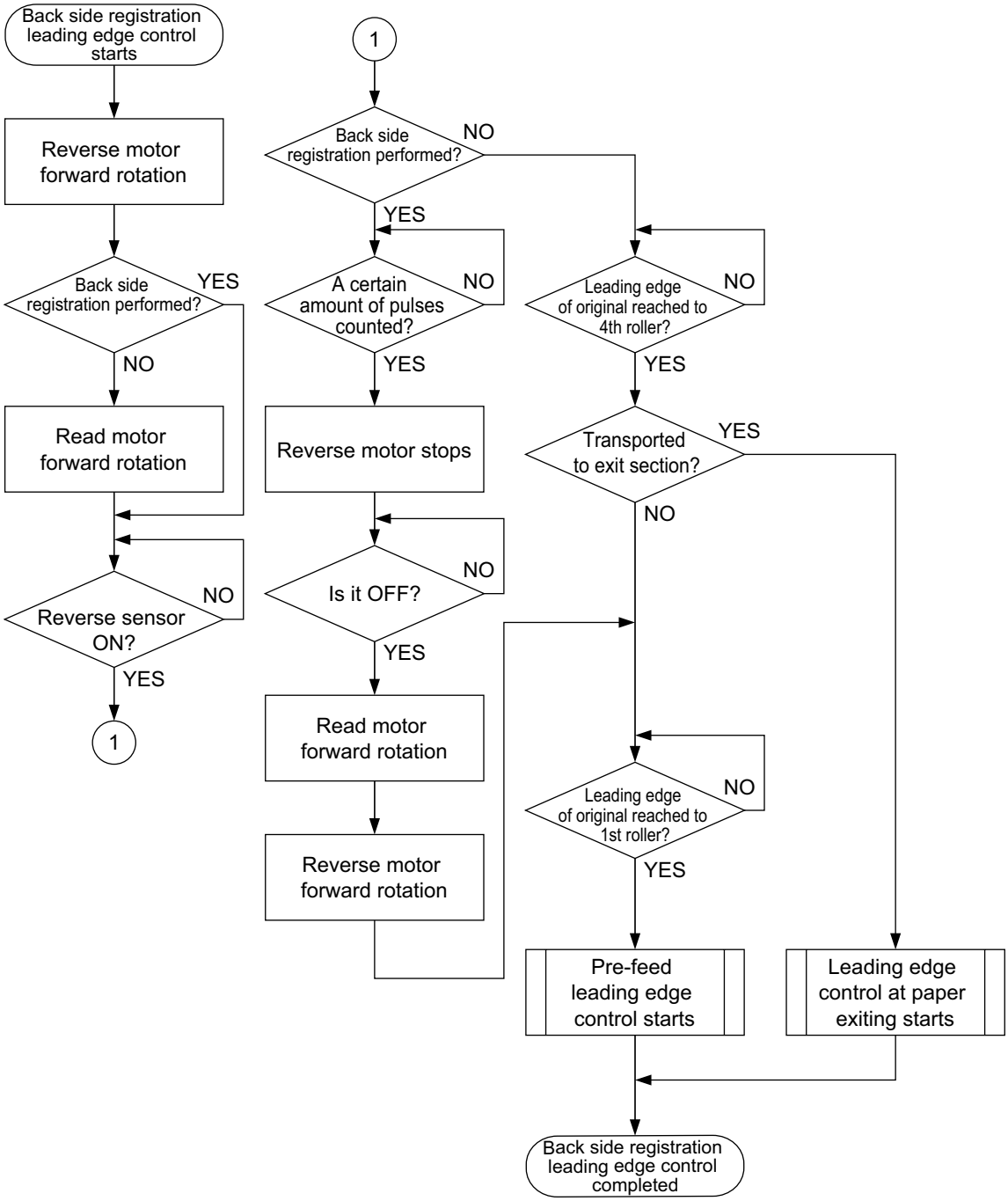


Fig.8-12

8.13 Back Side Registration Trailing Edge Control

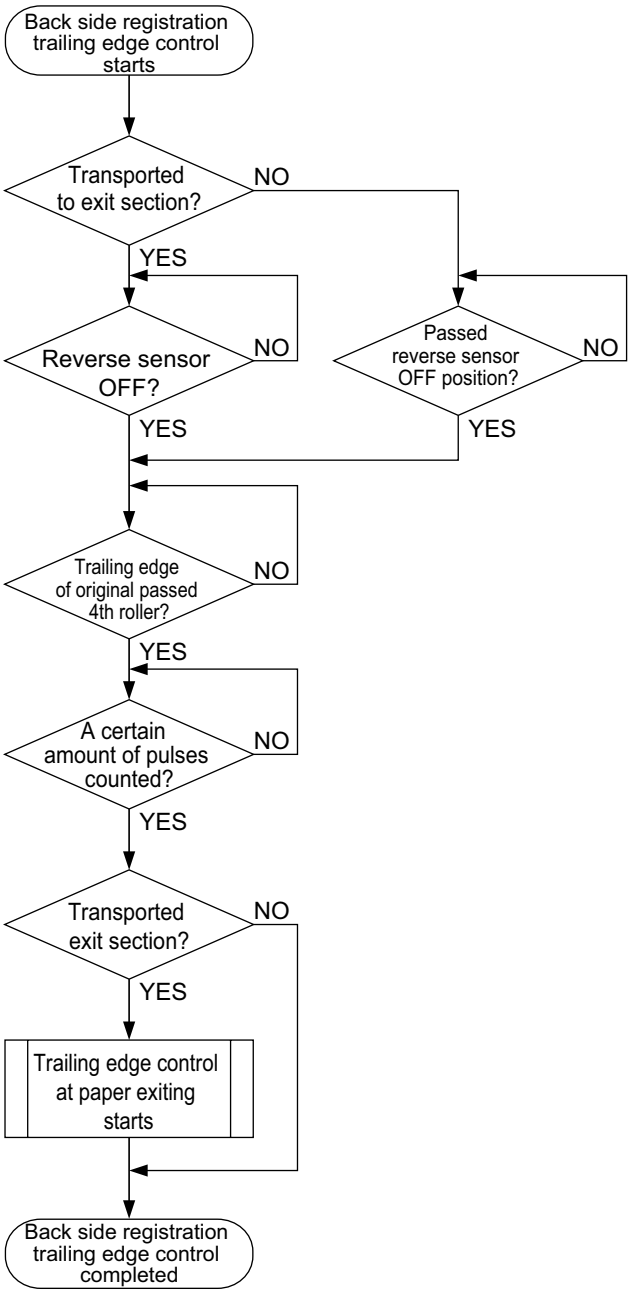


Fig.8-13

8.14 Leading/Trailing Edge Control at Paper Exiting

Fig.8-14

8.15 Next Original Detection Control

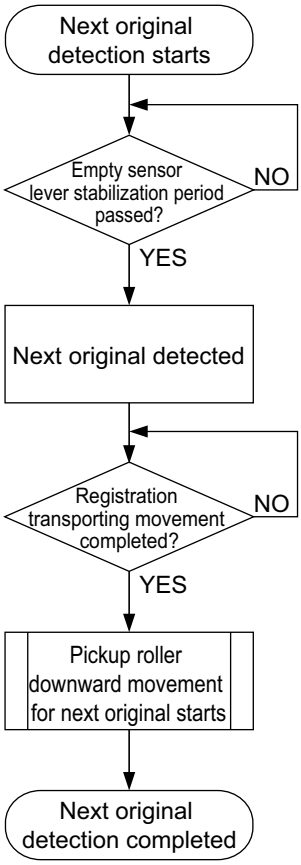


Fig.8-15

9. TIMING CHART

9.1 Single-sided Original

Single-sided, A4/LT Original at Black Mode; 2 Sheets (Reproduction Ratio - 100%)

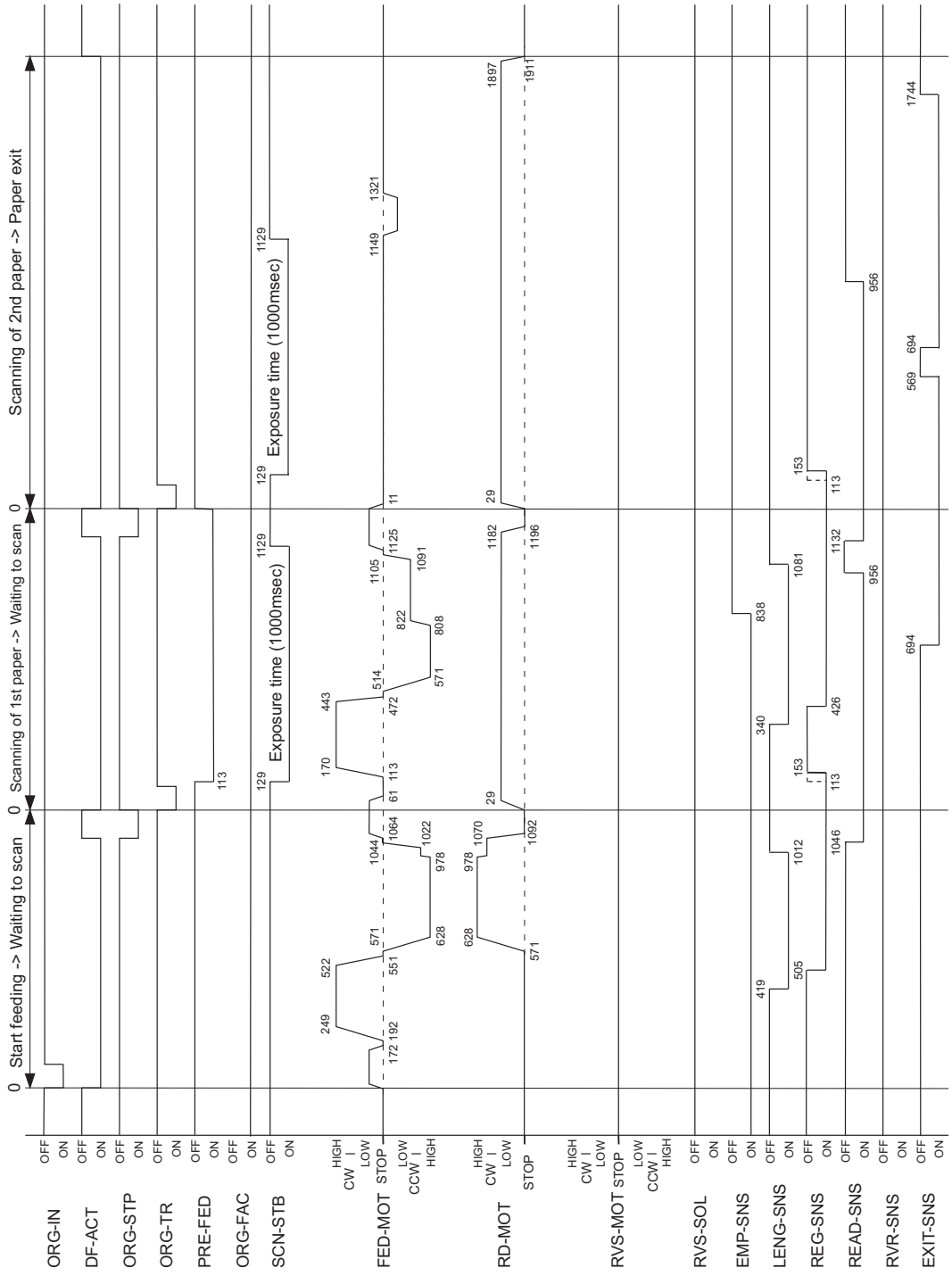


Fig.9-1

9.2 Double-sided Original

Double-sided, A4/LT Original at Black Mode; 2 Sheets (Reproduction Ratio - 100%)

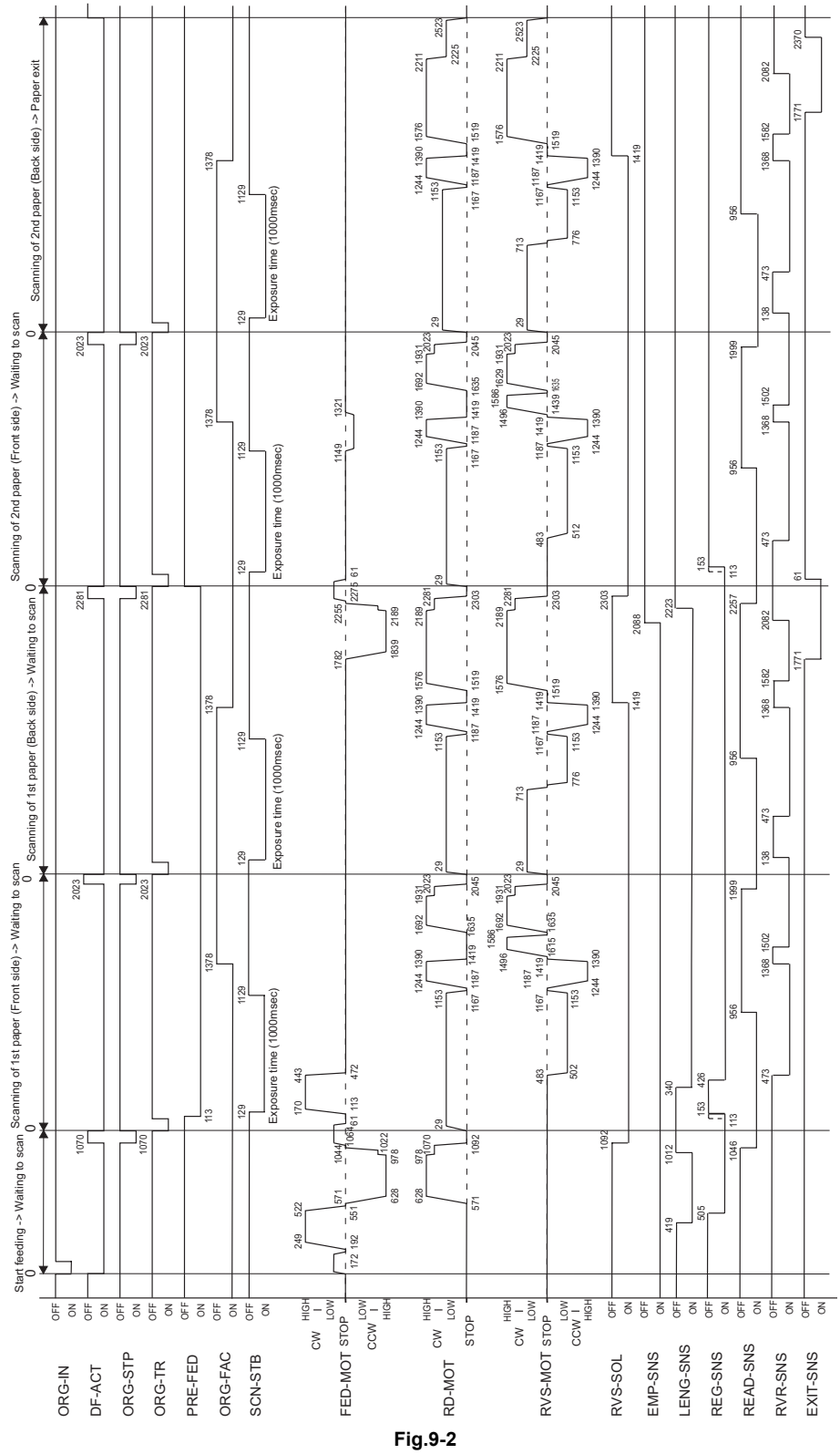


Fig.9-2

10. DESCRIPTION OF CIRCUITS

10.1 Input Circuits for Original Length Sensor, Read Sensor and Reverse Sensor

Since original length sensor, read sensor and reverse sensor have almost the same circuit configurations (the reference voltage of comparator for read sensor input circuit can be set by D/A output), the input circuits for the read sensor and reverse sensor are not described. The following is the input circuit for the original length sensor.

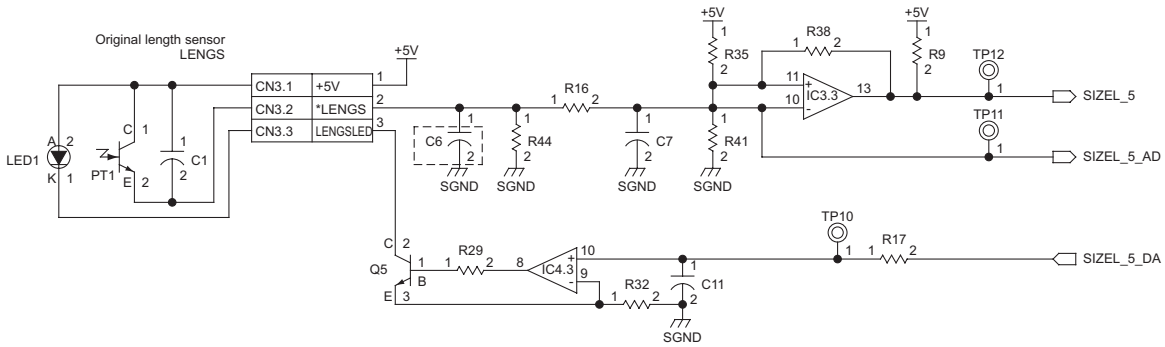


Fig.10-1

This circuit is an input circuit for the original length sensor and consists of a voltage-current conversion circuit which adjusts the amount of light of the infrared LED and the voltage comparison circuit which compares the voltage output from a phototransistor (PTR) with a reference voltage and converts the output voltage into digital signals.
The original length sensor is a mirror reflection sensor, and consists of a pair of emission elements (infrared LEDs) and a light receiving element (PTR). Both elements have a light axis running in the same direction. There is a mirror on the extended light axis of these elements. When there is no original between the elements and the mirror, infrared light emitted from LED is reflected by PTR in high reflectance. If there is an original, light emission to the mirror and reflected light from the mirror are blocked by the original, and the reflected light entering PTR becomes extremely small.
When a large amount of light is entering PTR (this means there is no original) the optical current flowing in the PTR is increased, and the voltage of Pin10 - IC3 becomes higher due to a drop in voltage caused by R44. IC3 is a comparator which compares the reference voltage input to Pin11 (non-reverse input terminal) with the signal voltage of Pin10 (reverse input terminal). If the voltage of Pin10 is higher, the output level (Pin13 - IC3) is “L”. On the contrary, when the amount of the incoming light is small (this means there is an original), the voltage of Pin10 - IC3 is low and the level becomes “H”. R16, C6 and C7 are noise filters. This circuit has an automatic sensitivity adjustment function to control the unevenness of the sensor sensitivity. Uneven sensor sensitivity is corrected by controlling the machine to have a constant PTR voltage when there is no original. The intensity of the infrared light emitted from the LEDs is changed to adjust the PTR voltage.
When the sensor sensitivity adjustment mode is selected, the PTR output voltage (analog value) is measured by the A/D input terminals of the CPU (scanner side). The D/A output voltage of the CPU is changed to keep the PTR output voltage to a certain level, and the LED current is adjusted by a voltage-current conversion circuit consisting of IC4, R29, Q5, etc. Each machine has a different D/A output voltage value, which is stored in the volatile memory.

10.2 Inrush Current Control Circuit

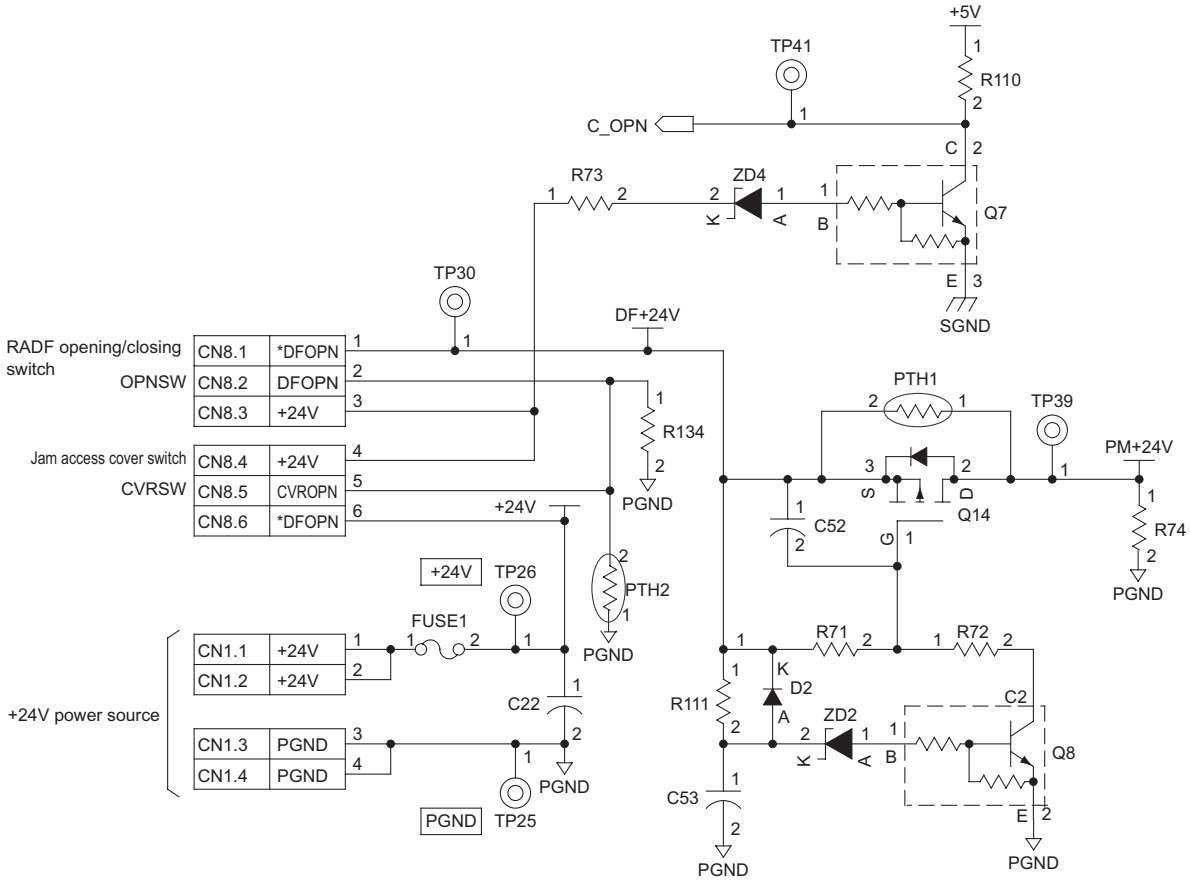


Fig.10-2

This circuit controls the inrush current flowing into the current regeneration capacitors (C23, C76 and C40) mounted on the drive circuits for the read motor and reverse motor to a certain value. The circuit consists of a posister (PTH1) which controls the current and FET (Q14) which supplies the current in normal conditions.

Base current is not supplied to Q8 and it becomes OFF after the RADF opening/closing switch and jam access cover switch are turned OFF until the cathode voltage of ZD2 reaches the zener voltage. At this time, both voltages are set by R111 and C53. Q14 is turned OFF correspondingly to supply the current to PTH1.

When the cathode voltage of ZD2 exceeds the zener voltage after the time allowance given by R111 and C53, a base current is supplied to Q8 to turn it ON and Q14 comes ON correspondingly. The current limitation is canceled and the current flowing in the PTH1 starts to be supplied to Q14.

R74 is discharge resistor to capture charge stored in consisting C23, C76 and C40 right after either of the RADF opening/closing switch or jam access cover switch is opened. The circuit consisted of D2 and PTH2 captures the charge stored in C53 right after either the RADF opening/closing switch or the jam access cover switch is opened, and also controls inrush current for instantaneous opening/closing of the cover.

10.3 Drive Circuit for Read Motor

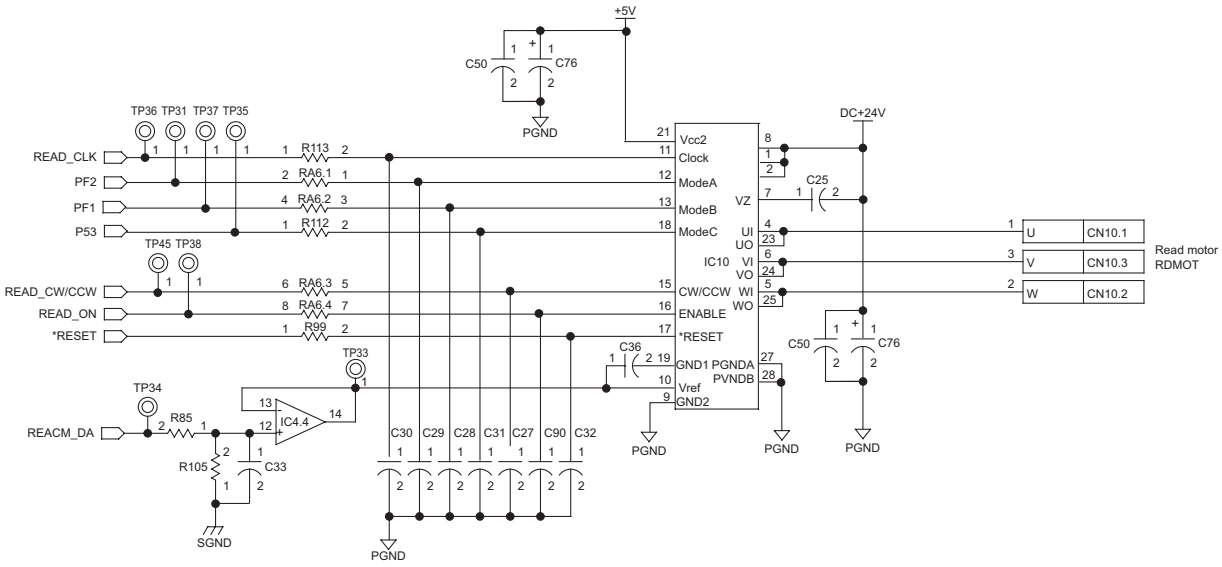


Fig.10-3

This circuit controls the rotation, stoppage, rotation direction, excitation mode and motor current of the read motor.
A drive clock signal (READ_CLK) and rotation direction signal (READ_CWB) are input to control the speed and direction of the motor rotation. When the CPU judges the level of the enabling signal is “L”, Pin16 - IC10 (READ_EN) becomes “L” level and turns OFF all the outputs from the drive IC regardless of the state of other signals.
The output voltage of the D/A converter is separated at R85 and R105, and input into Pin10 - IC10 to set the motor current value. The motor current value can be changed by altering the D/A output voltage.

10.4 Drive Circuit for Reverse Motor

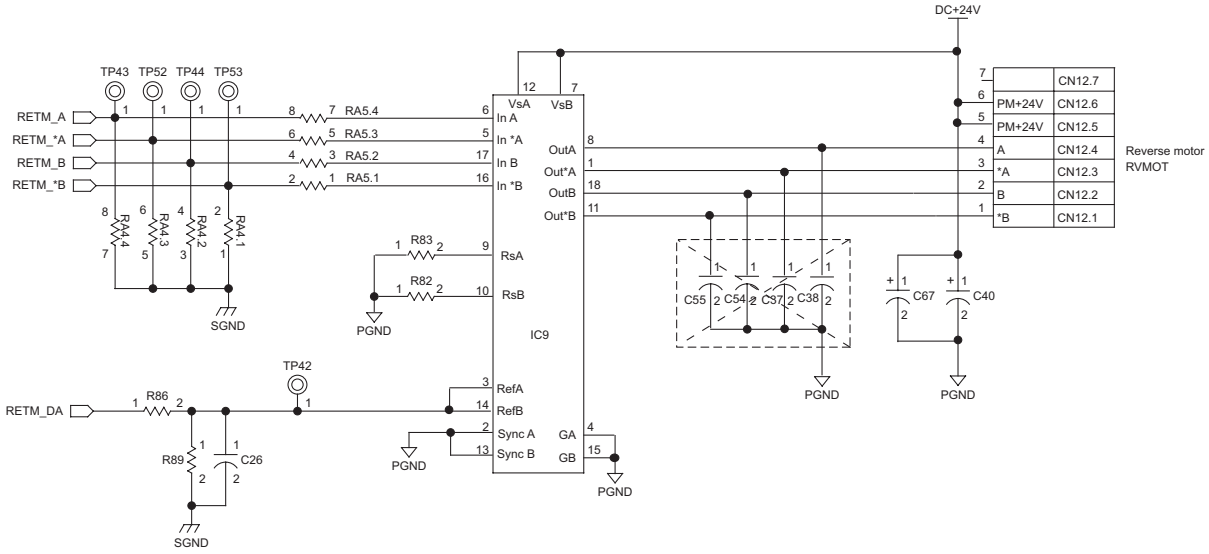


Fig.10-4

This circuit controls the rotation, stoppage, rotation direction and motor current of the reverse motor. The following drive pattern signals are input to Pins5, 6, 16 and 17 - IC9 to control the direction and speed of motor rotation. The motor current value is set by separating the output voltage of the D/A converter at R86 and R89, and inputting it into Pins3 and 14 - IC9. Motor current value can be changed by changing the D/A output voltage.

Drive pattern signals....1-2 phase excitation

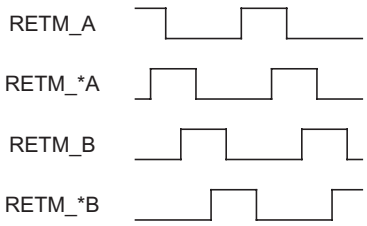


Fig.10-5

10.5 Drive Circuit for Feed Motor

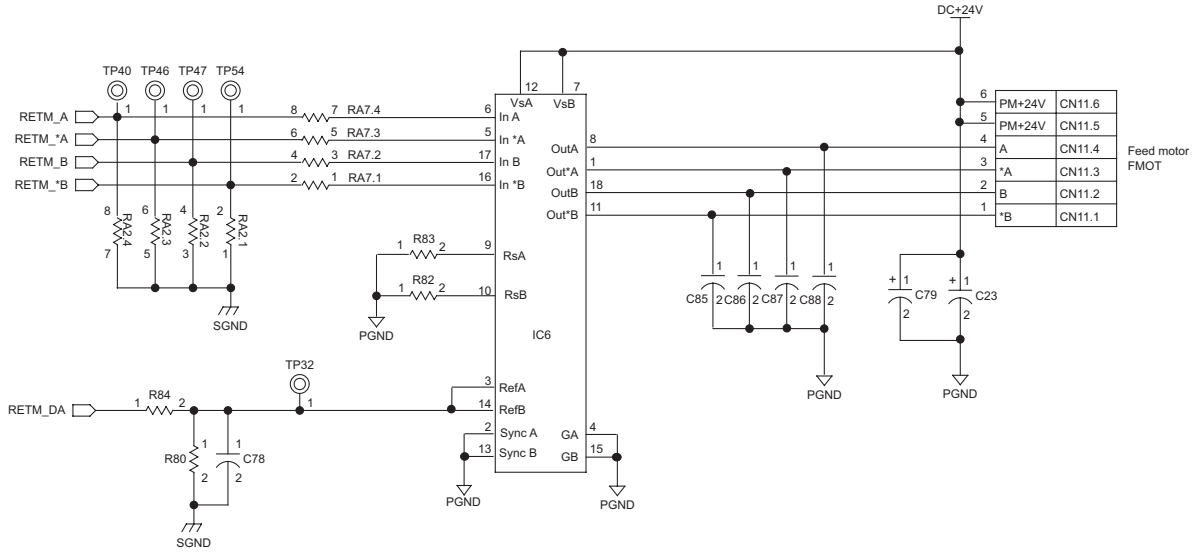


Fig.10-6

This circuit controls the rotation, stoppage and rotation direction of the feed motor.
The following drive pattern signals are input to Pins5, 6, 16 and 17 to control the direction and speed of motor rotation. The motor current value is set by separating the output voltage of the D/A converter at R86 and R89, and inputting it into Pins3 and 14. Motor current value can be changed by changing the D/A output voltage.

Drive pattern signals.... 1-2 phase excitation

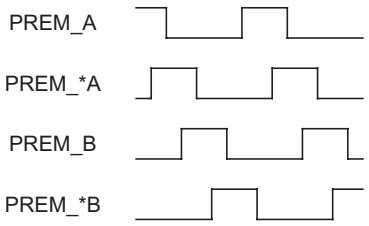


Fig.10-7

10.6 Drive Circuit for Fan Motor

This circuit controls the rotation and stoppage of the fan motor.
When the output level of CPU is “H”, Q12 and Q16 are turned ON and drive the fan motor. At this time, a lock detection signal is output from the fan motor and sent to the CPU. The level of the lock detection signal is “L” during normal operation and becomes “H” during abnormal operation.

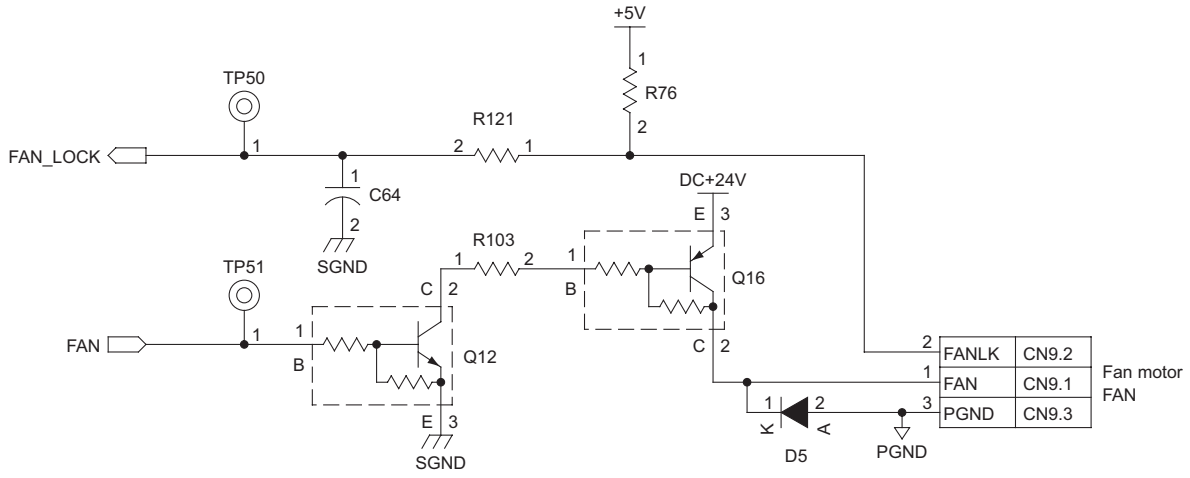


Fig.10-8

10.7 Drive Circuit for Reverse Solenoid

This circuit controls the opening/closing of the flapper of the reverse solenoid.
When the level of RKNSOL_PWM is “H”, Q13 is turned ON and the flapper is closed. The drive signal for the solenoid is a PWM signal. The flapper is closed in the maximum torque of the solenoid and the duty value becomes 100% when the flapper is started to be closed. The duty value is then decreased down to 50% and the flapper is kept closed while the temperature rising of the solenoid is lowered.

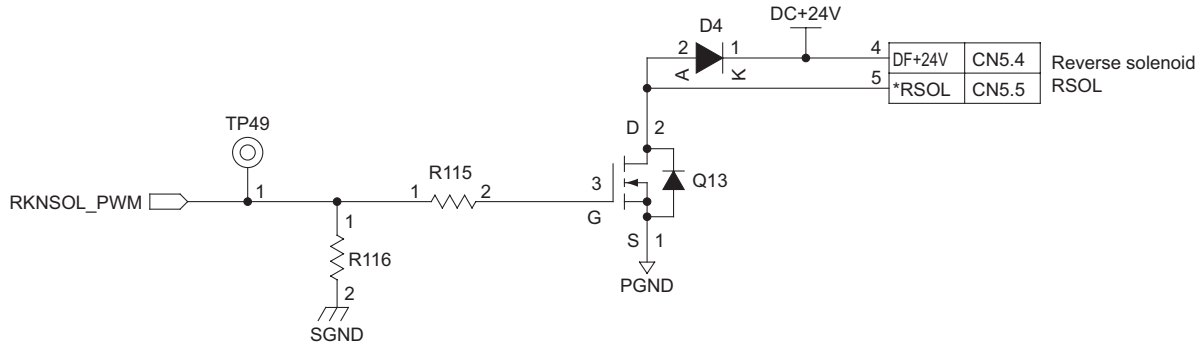


Fig.10-9

10.8 Reset Circuit

This circuit generates a CPU reset signal when the power is turned ON and the power voltage is cut off or lowered instantaneously. This circuit has a watchdog timer for diagnosis of the CPU system operation.

The level of Pin8 - IC8 (*RES) is normally “H” after the power is turned ON. However, when the power is turned OFF or the voltage of the +5 V power supply is decreased to 4.2 V or lower for some reason, the level of Pin8 - IC8 becomes “L” and the CPU is reset. A clock with a fixed cycle is input to Pin3 - IC8 (CK) from the CPU to clear the watchdog timer of IC8. If the clock is not input from CPU due to a system error, the level of Pin8 - IC8 becomes “L” to reset CPU and system operation is stopped.

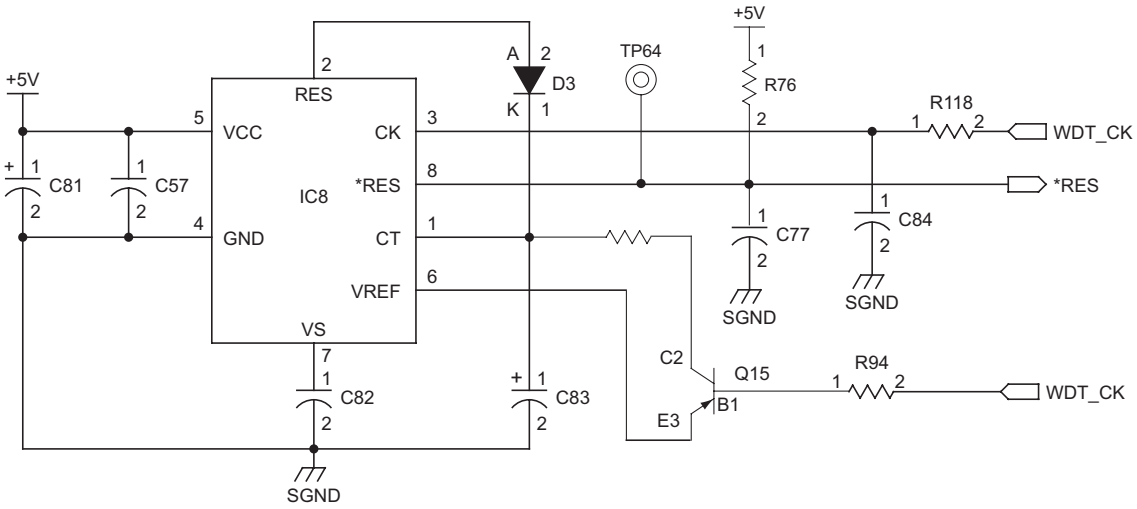


Fig.10-10

10.9 EEPROM Circuit

This circuit is an EEPROM to store ADF data and its peripheral circuit.
IC12 is a memory to store the adjustment value for reflection-type sensors, and data are sent/received between IC12 and CPU using a 4-line type serial interface. Data saved in the IC12 is not erased even if the power is turned OFF.
Pin1 - IC12 (CS) is a chip selection terminal and its level is “H” when data are being sent/received.
Pin2 - IC12 (CLK) is a serial clock terminal, and the serial data are sent in synchronization with the clock input which is input to this terminal.
Pin3 - IC12 (DI) is a input terminal for serial data and Pin4 (DO) is an output terminal for serial data.

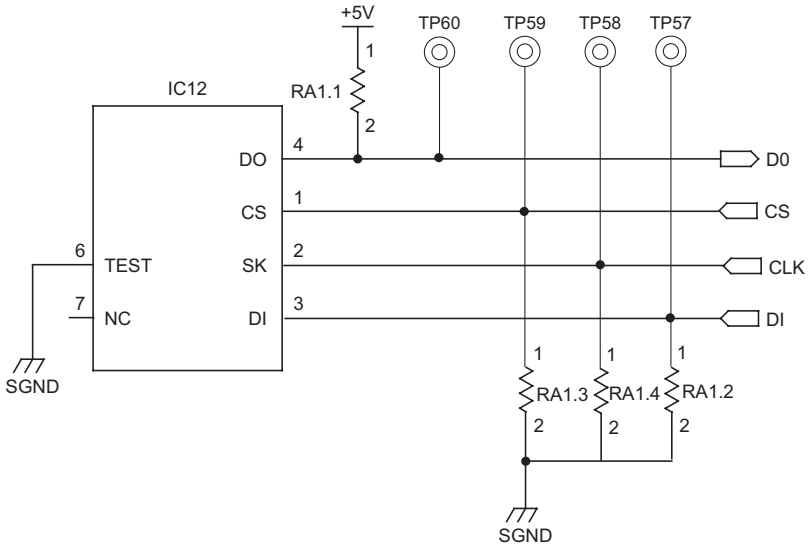


Fig.10-11

11. DESCRIPTION OF INPUT/OUTPUT SIGNALS

11.1 REQ Signal, ACK Signal and TxD Signal

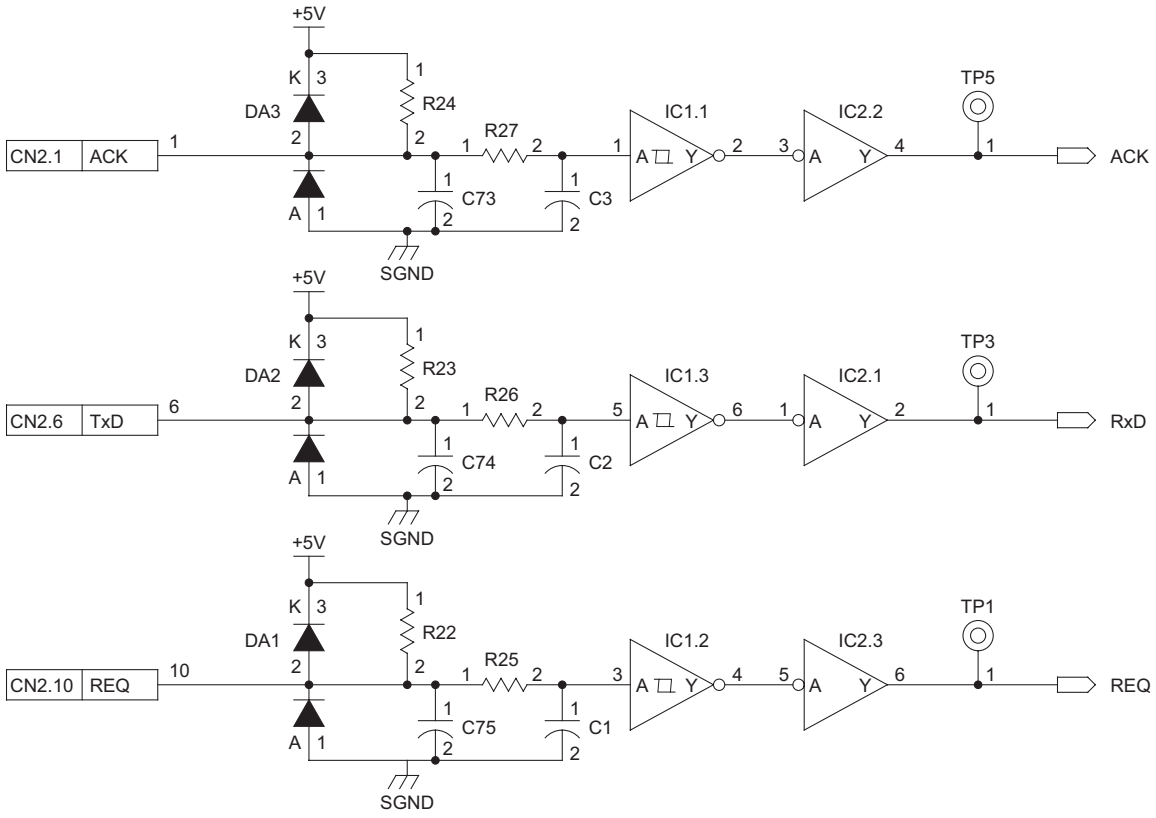


Fig.11-1

This circuit is an input circuit for communication with the scanner. The input is “1” for 5 V and “0” for 0 V.
The logic for the connector area and that for the input port of CPU are the same.
REQ signal is a communication request signal from the equipment to the RADF.
ACK signal is a communication signal from the equipment to the RADF.
This is done by requesting and acknowledging.
TxD signal transmits data from the equipment to the RADF.

11.2 DF-ACK Signal, DF-REQ Signal and RxD Signal

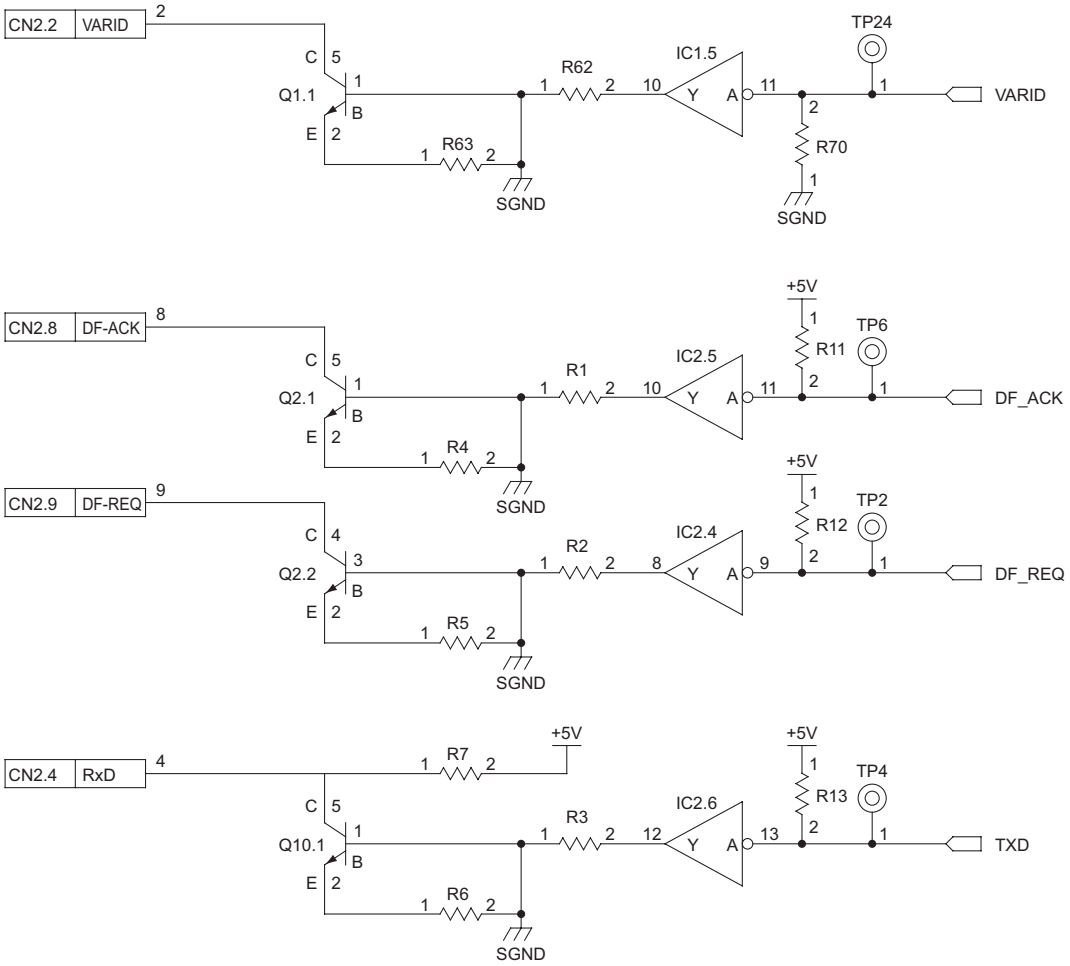


Fig.11-2

This circuit is an output circuit for communication with the scanner. The output is “1” for 5 V and “0” for 0 V. The logic for the connector area and that for the output port of CPU are the same.
DF-ACK signal is a communication signal from the equipment to the RADF.
DF-REQ signal is a communication request signal from the RADF to the equipment.
RxD signal transmits data from the RADF to the equipment.
Each signal output is transmitted through the buffer of the open-collector.

11.3 Input Circuits for Sensors

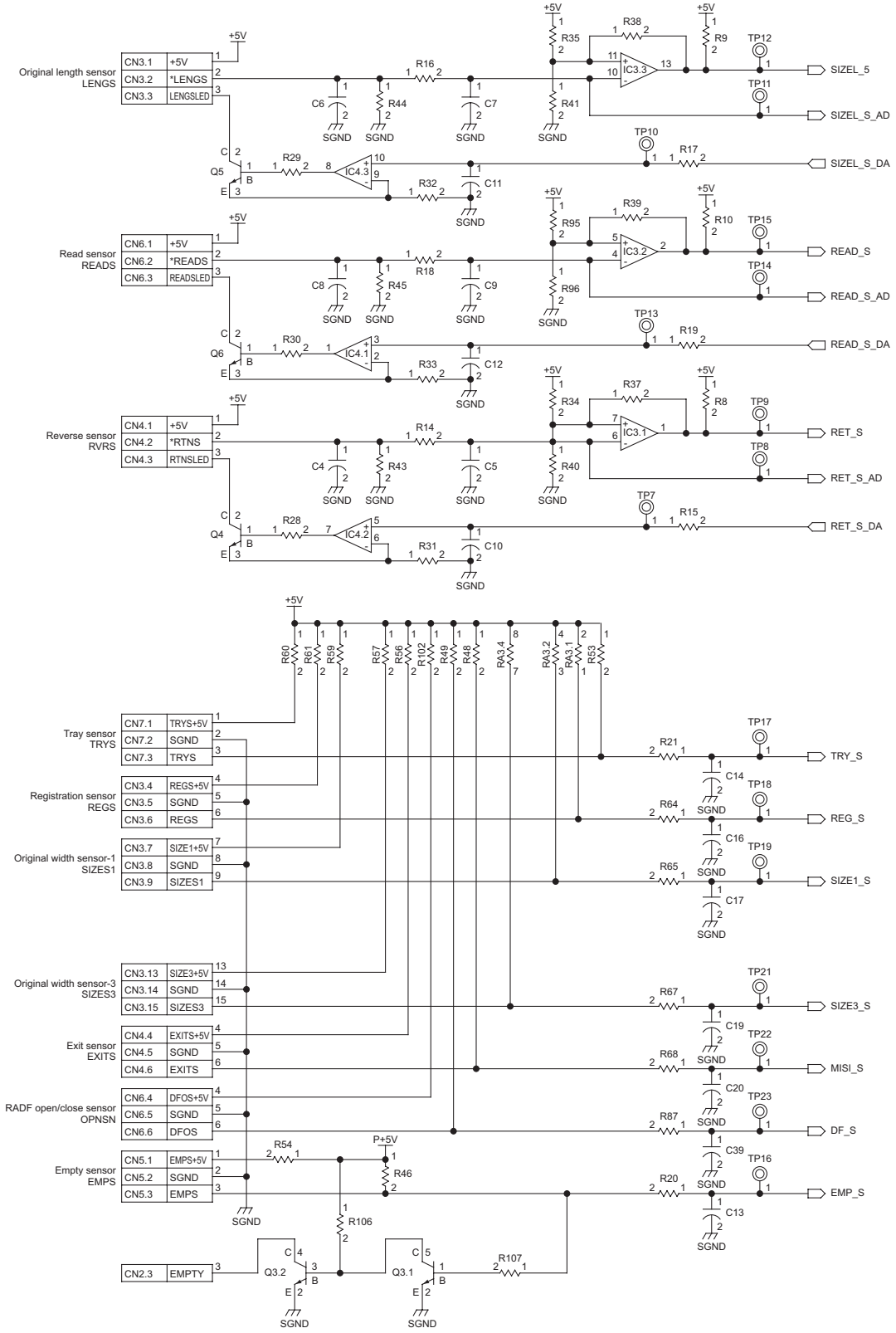


Fig.11-3

The circuits above are the input signals of each optical sensor.
The original length sensor, reverse sensor and read sensor are driven by the ON/OFF of Q4, Q5 and Q6.
Other sensors are operated constantly.

Signal logic

Name	Connector level 5 V (“1”)	Connector level 0 V (“0”)
EMPS (Empty sensor)	Original not exist	Original exists
REGS (Registration sensor)	Original exists	Original not exist
EXITS (Exit sensor)	Original exists	Original not exist
SIZES1 (Original width sensor-1)	Original exists	Original not exist
SIZES3 (Original width sensor-3)	Original exists	Original not exist
TRYS (Tray sensor)	Original exists	Original not exist
OPNSN (RADF opening/closing sensor)	RADF closed	RADF opened
LENGS (Original length sensor)	Original not exist (connector voltage 1.69 V or higher)	Original exists (connector voltage lower than 1.69 V)
READS (Read sensor)	Original not exist (connector voltage 1.69 V or higher)	Original exists (connector voltage lower than 1.69 V)
RVRS (Reverse sensor)	Original not exist (connector voltage 1.69 V or higher)	Original exists (connector voltage lower than 1.69 V)

12. DISASSEMBLY AND ASSEMBLY

12.1 Pickup Roller and Feed Roller

(1) Open the jam access cover.
(2) Remove 2 screws and take off the cover guide.

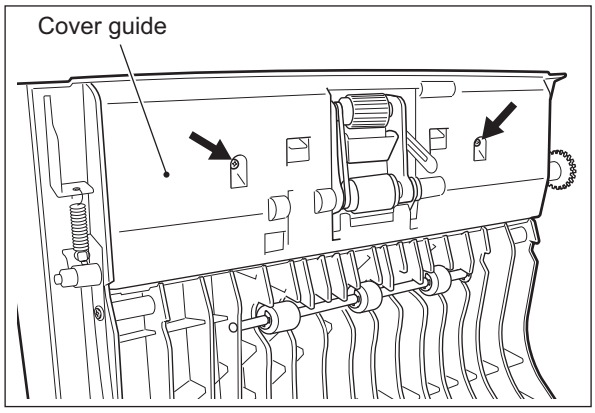


Fig.12-1

(3) Remove the clips at the both sides of the pickup roller unit. Slide the bushings and take off the pickup roller unit.

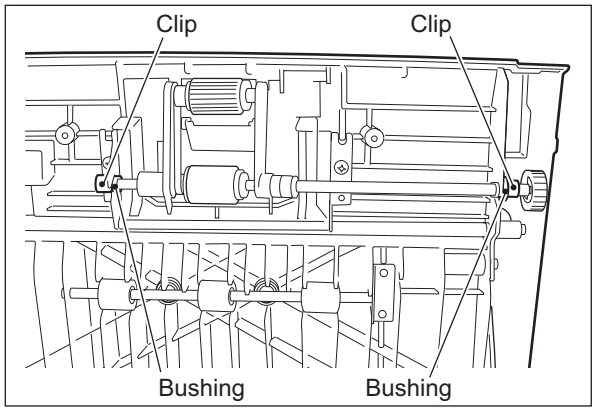


Fig.12-2

(4) Remove 2 clips and slide the feed roller, pickup roller and pickup arm to pull out the parallel pin. And then take off the pickup arm, pickup roller and feed roller.

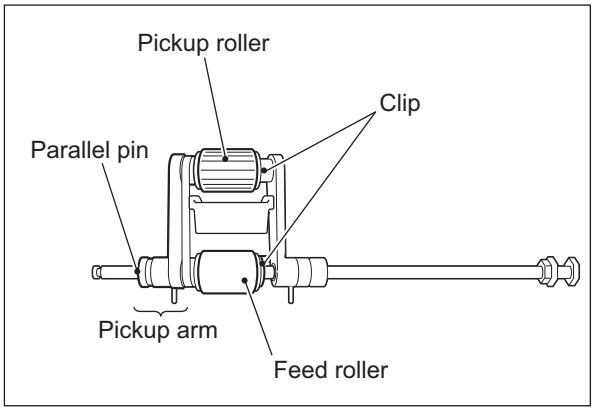


Fig.12-3

12.2 Separation Roller

(1) Open the jam access cover.
(2) Remove 2 screws and take off the separation roller cover.

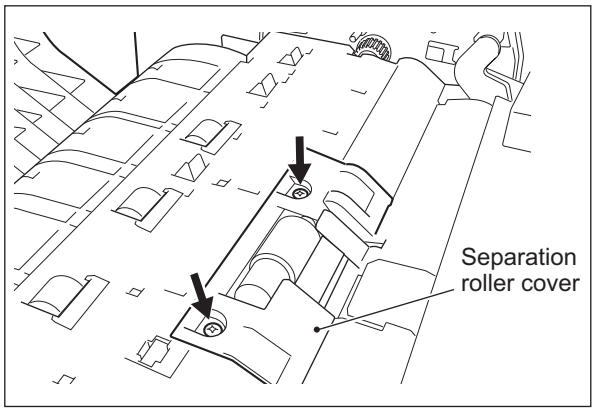


Fig.12-4

(3) Remove 2 clips and slide 2 bushings to remove the separation roller from the holder.

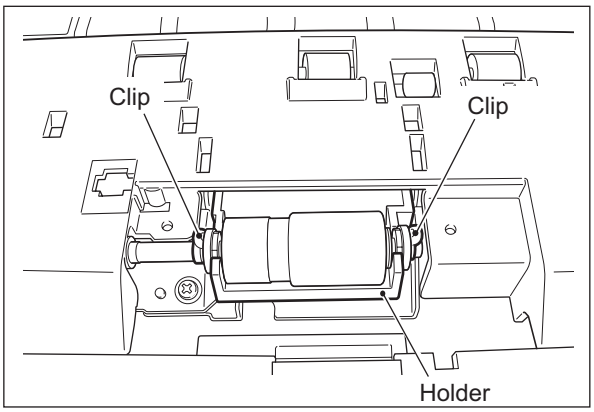


Fig.12-5

(4) Remove the E-ring, and pull out the separation roller from the shaft.

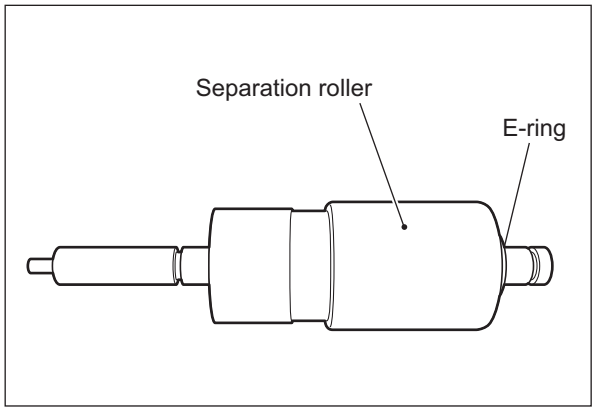


Fig.12-6

12.3 Reverse Solenoid

(1) Open the RADF and remove 1 screw at the lower part of the front cover.

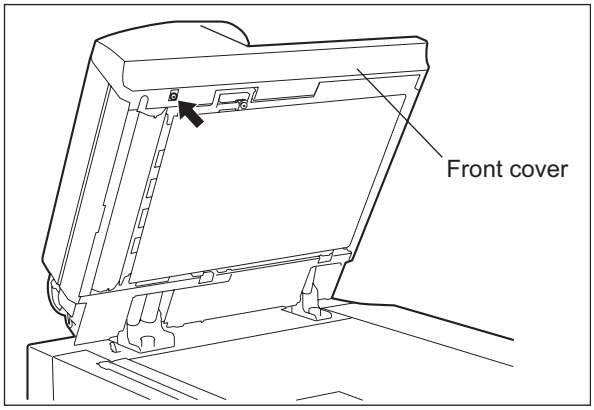


Fig.12-7

(2) Open the jam access cover and the platen unit, and remove 1 screw of the front cover. Then release 3 latches and slide the front cover to take it off.

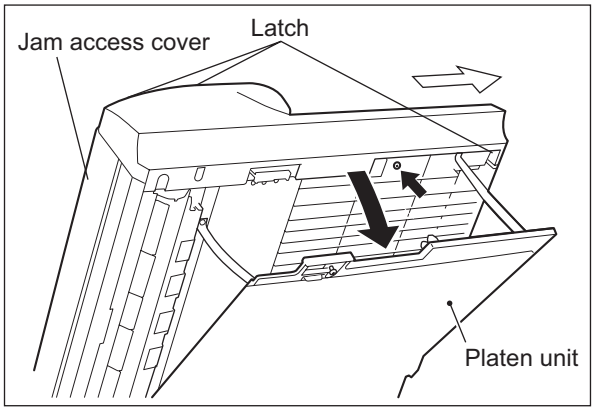


Fig.12-8

(3) Disconnect 1 connector and remove 2 screws. Take off the plate spring and reverse solenoid.

Note:
When installing the reverse solenoid, refer to "13.7 Adjustment of reverse solenoid" to adjust it.

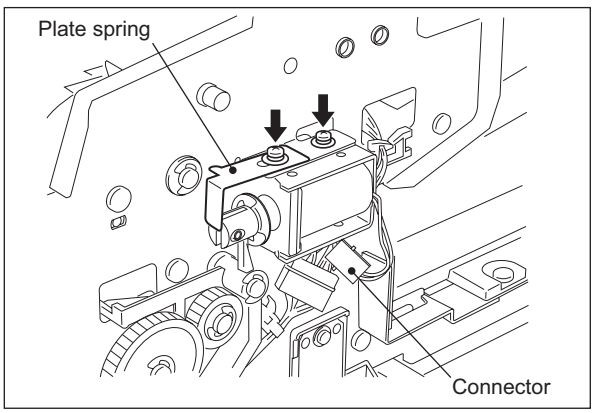


Fig.12-9

12.4 Fan Motor

(1) Remove 3 screws and take off the rear cover.

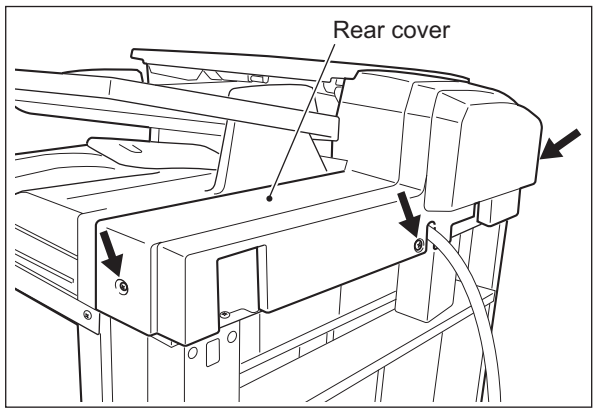


Fig.12-10

(2) Disconnect 1 connector, and then remove 1 screw to take off 1 clamp with the fan motor bracket.

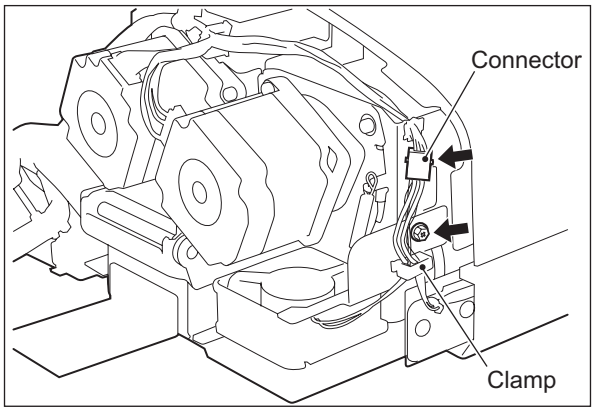


Fig.12-11

(3) Remove 2 screws and take off the fan motor from the bracket.

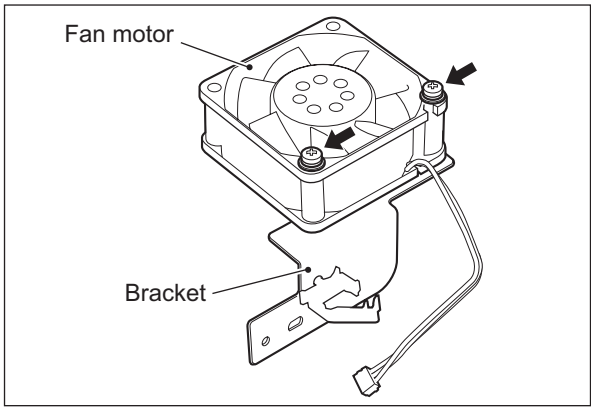


Fig.12-12

12.5 Read Motor

[A] Disassembly

(1) Disconnect 1 connector and remove 1 binding band and 1 clamp.
(2) Remove 4 screws and take off the read motor with the bracket.

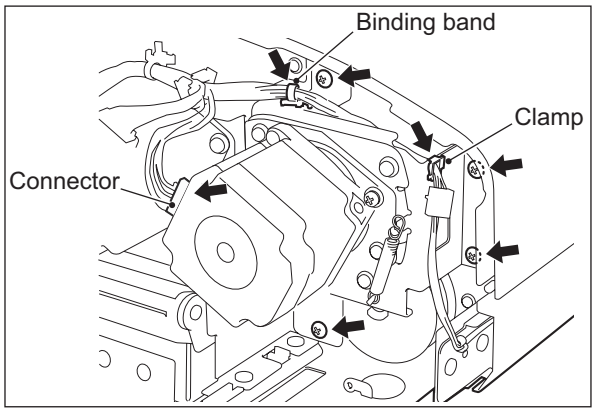


Fig.12-13

(3) Loosen 2 belt tension screws ① and 1 bracket fixing screw ②. Hold the read motor to the direction of the arrow (to the right), and then fix it temporarily with 2 belt tension screws ①.
(4) Remove 2 screws ③ and take off the read motor from the bracket.

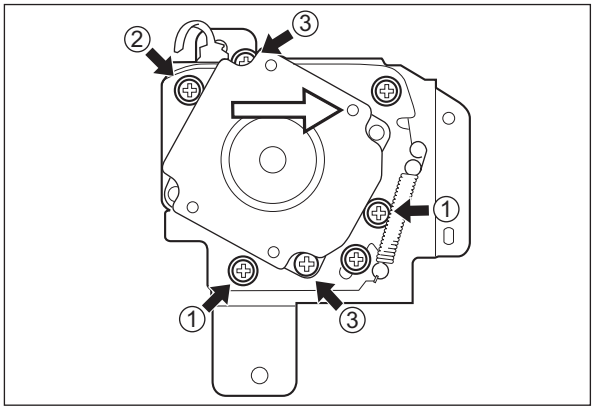


Fig.12-14

[B] Assembly

(5) Attach the read motor to the bracket with 2 screws ①.
(6) Loosen 2 belt tension screws ② and 1 bracket fixing screw ③. Hold the motor to the direction of the arrow (to the right), fix it temporarily with 2 belt tension screws ② and put the belt.
(7) Loosen the belt tension screws ④, hold the read motor to the direction of the arrow (rotating direction) and fix it temporarily with 2 screws.

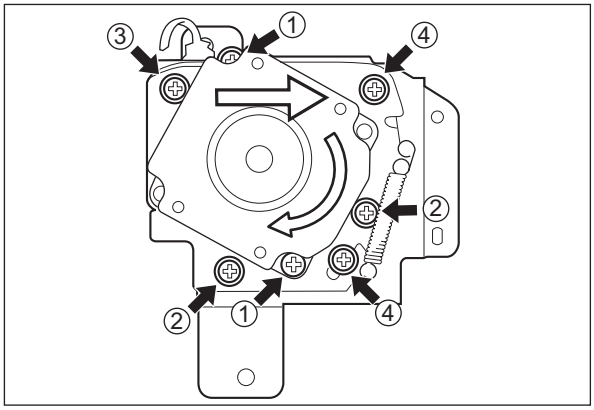


Fig.12-15

(8) Loosen 2 belt tension screws ① which have been temporarily fixed. Tighten them after checking that the timing belt is strained by the spring.

Note:
Make sure that the belt is not twisting.

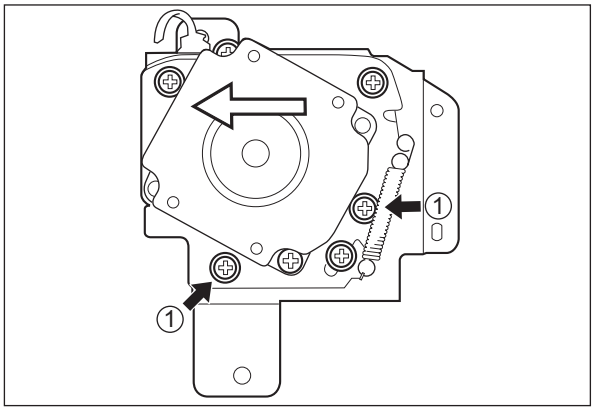


Fig.12-16

(9) Put the timing belt on the pulley of the RADF and double-deck pulley. Attach the bracket with the read motor to the rear frame with 4 screws.

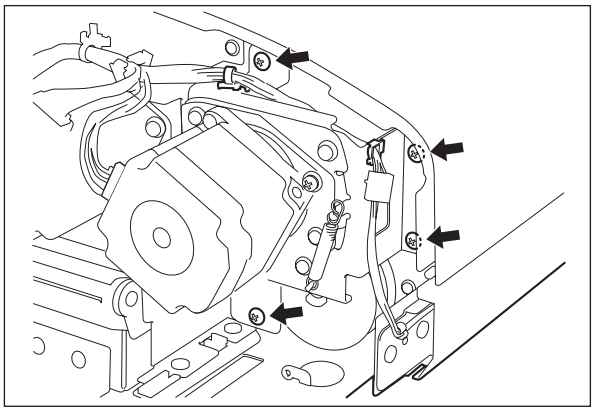


Fig.12-17

(10) Loosen 2 belt tension screws ① and tighten 3 screws after checking that the timing belt is strained because the motor moves to the direction of the arrow (rotating direction) by the spring.

Note:
Make sure that the belt is not twisting.

(11) Connect 1 connector and attach 1 binding band and 1 clamp.

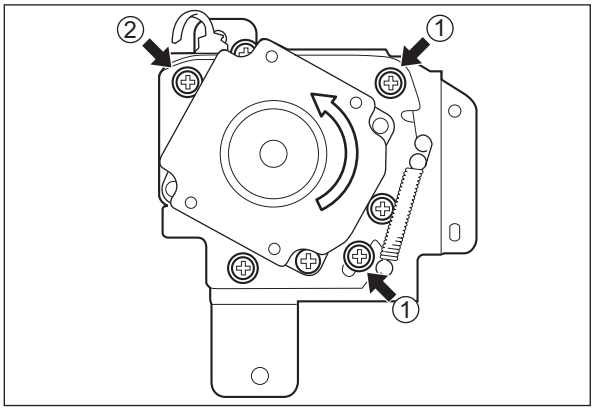


Fig.12-18

12.6 RADF Opening/Closing Switch

[A] Disassembly

(1) Disconnect 3 connectors.
(2) Remove 1 screw and take off the RADF opening/closing switch with the bracket.

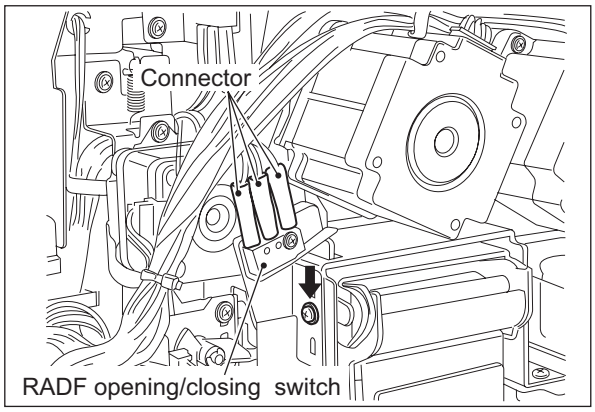


Fig.12-19

(3) Remove 1 screw and take the RADF opening/ closing switch apart from the bracket.

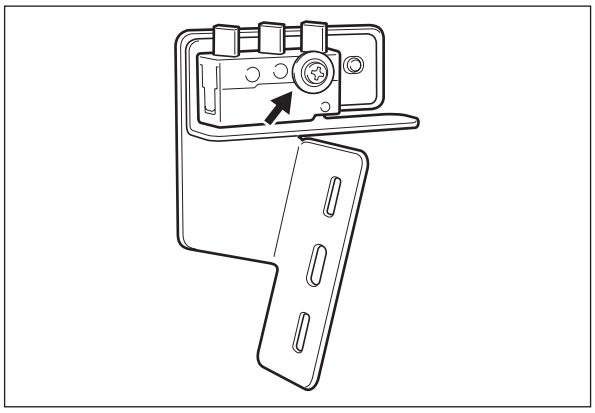


Fig.12-20

[B] Assembly

(4) Attach the RADF opening/closing switch to the bracket, and then connect the connectors as shown in the right figure.

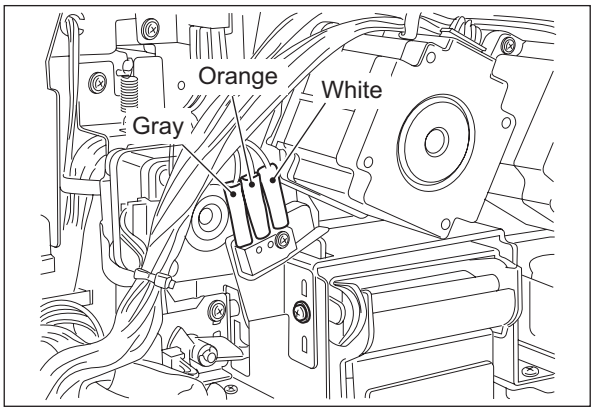


Fig.12-21

12.7 Feed Motor

[A] Disassembly

(1) Remove the harness from 2 clamps and 2 binding bands, and then disconnect 2 connectors.

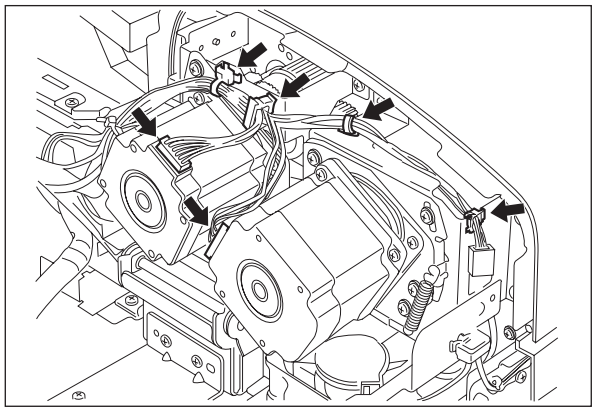


Fig.12-22

(2) Loosen 2 belt tension screws ①, hold the motor to the direction of the arrow (rotating direction) and fix it temporarily with the screws.
(3) Remove 2 screws ② and take off the feed motor.

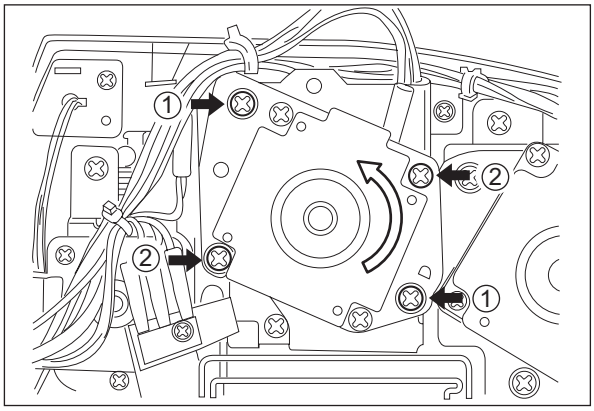


Fig.12-23

[B] Assembly

(4) Attach the feed motor with 2 screws ① and put the belt.
(5) Tighten the screws after checking that the timing belt is strained because the motor moves to the direction of the arrow (rotating direction) by the spring when loosing 2 belt tension screws ②.

Note:
Make sure that the belt is not twisting.

(6) Connect 2 connectors and attach 2 binding bands and 2 clamps.

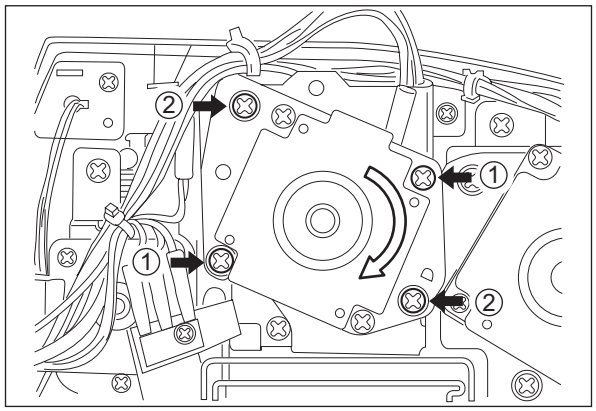


Fig.12-24

12.8 Reverse Motor

[A] Disassembly

(1) Disconnect 1 connector and remove 1 spring.
(2) Remove 2 screws and take off the reverse motor with the bracket.

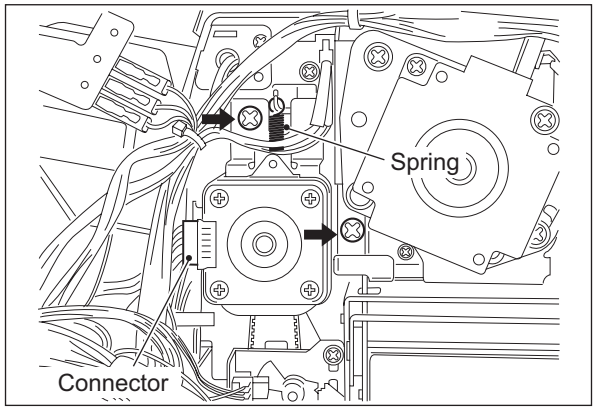


Fig.12-25

(3) Take off the reverse motor with 2 screws.

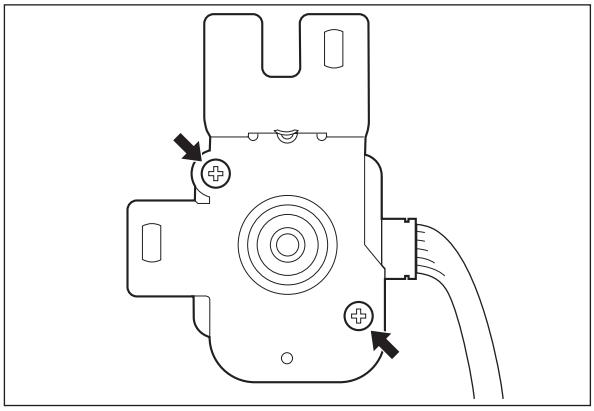


Fig.12-26

[B] Assembly

(4) Fix the reverse motor to the bracket with 2 screws, put the timing belt on the motor and the pulley of RADF side and then fix it temporarily with 2 screws.

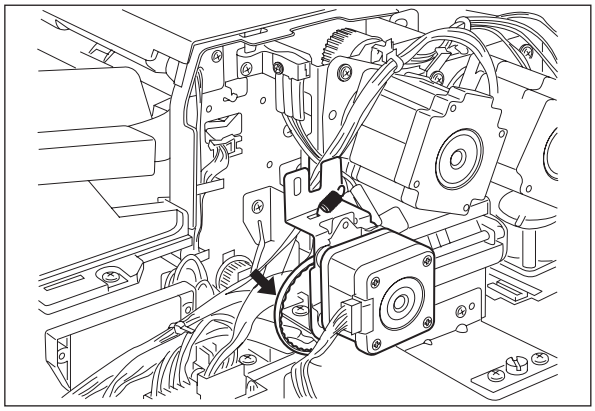


Fig.12-27

(5) Attach the spring, check that the timing belt is strained and tighten 2 screws.
(6) Connect the connector.

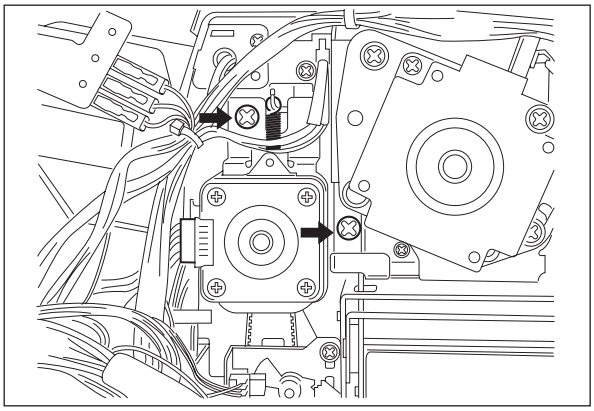


Fig.12-28

12.9 RADF Opening/Closing Sensor

(1) Disconnect 1 connector.
(2) Remove 1 screw and take off the RADF opening/closing sensor with the bracket.
(3) Release the latches and take off the sensor from the bracket.

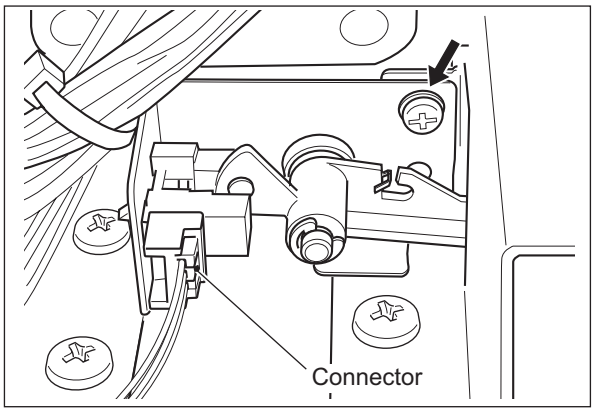


Fig.12-29

12.10 PC Board

(1) Disconnect 12 connectors and release 4 lock supports, and then take out the PC board.

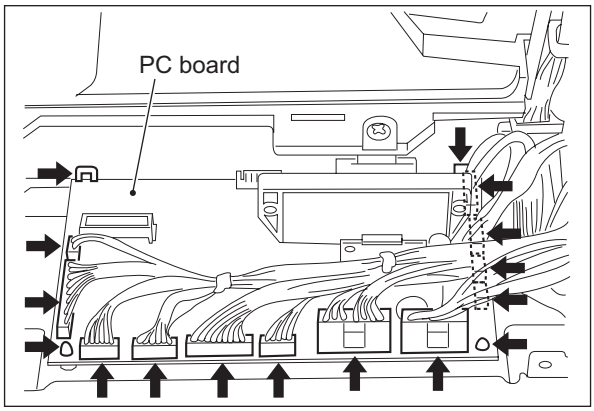


Fig.12-30

12.11 Jam Access Cover Switch

[A] Disassembly

(1) Disconnect 3 connectors and remove 1 fixing screw, and then take off the switch.

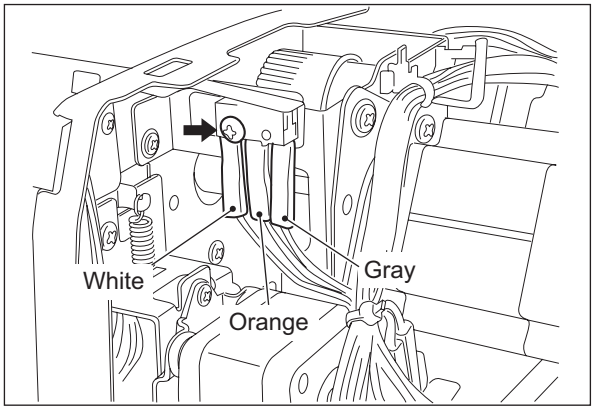


Fig.12-31

[B] Assembly

(1) Fix the jam access cover switch to the bracket, and then connect the connectors as shown in the upper right figure.

12.12 Tray Sensor

(1) Turn over the tray to remove 3 screws at the back and take off the tray lower cover.

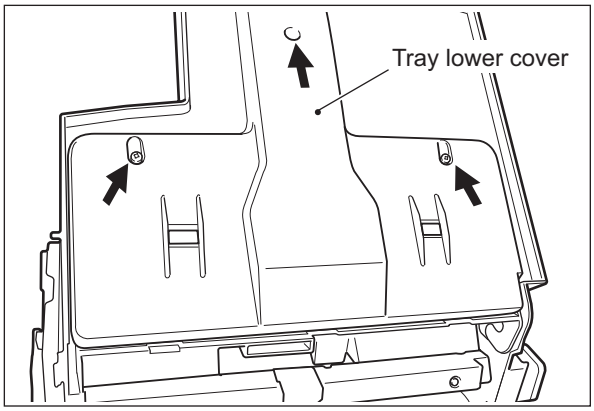


Fig.12-32

(2) Disconnect 1 connector.
(3) Release the latches of the sensor and take off the tray sensor.

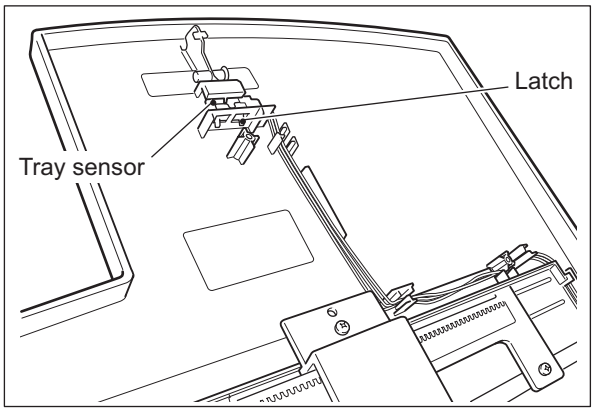


Fig.12-33

12.13 Empty Sensor/Registration Sensor/Original Width Sensor/ Original Length Sensor

(1) Open the jam access cover.
(2) Open the reverse guide and take it off upward while pushing it to the direction of the arrow.

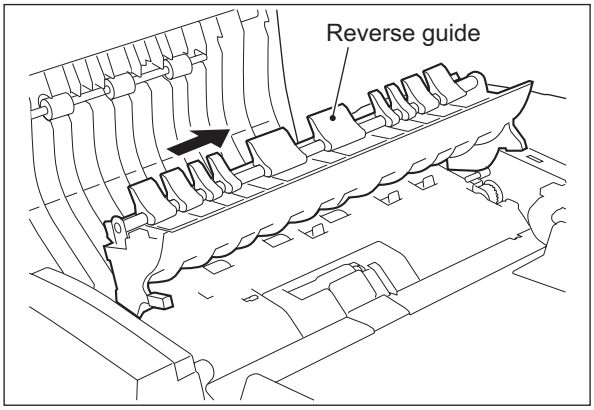


Fig.12-34

(3) Open RADF and remove 1 screw at the lower part of the front cover.

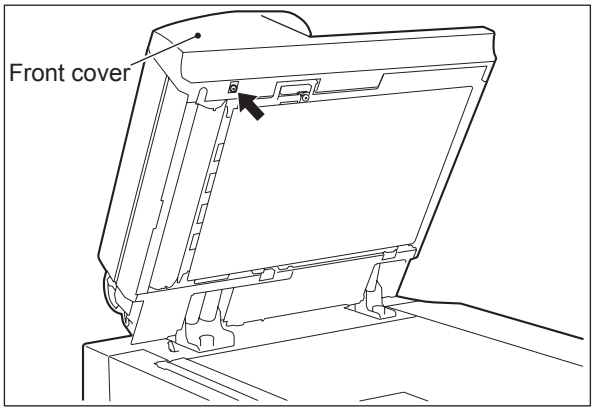


Fig.12-35

(4) Open the platen unit and remove 1 screw at the lower part of the front cover. And then release 3 latches and slide the front cover horizontally to take it off.

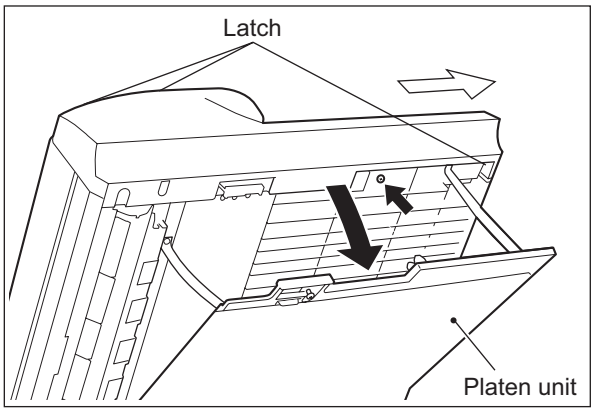


Fig.12-36

(5) Turn over the tray and remove 2 screws fixing the feeder guide.

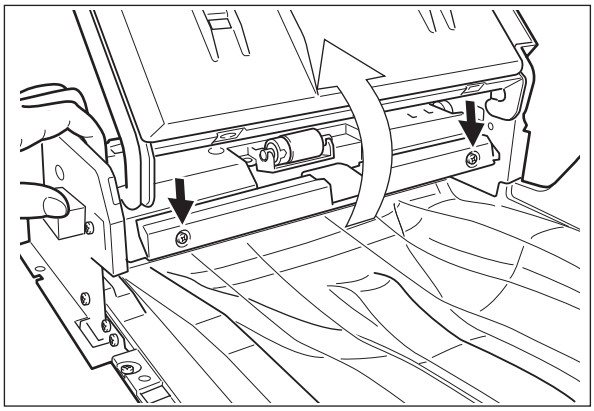


Fig.12-37

(6) Remove 1 screw fixing the holder for supporting the front side of tray, and detach the tray from the frame.

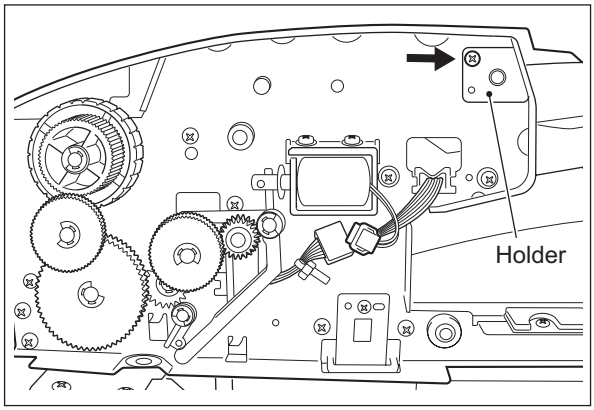


Fig.12-38

(7) Release 2 latches of the feed guide and turn it over.

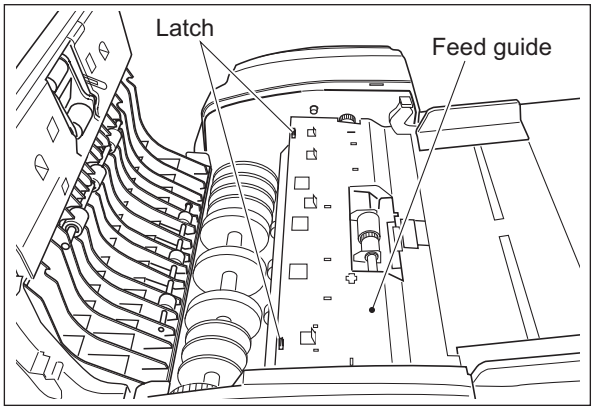


Fig.12-39

(8) Disconnect the connectors and release the latches. Remove the empty sensor, registration sensor, original width sensor and original length sensor.

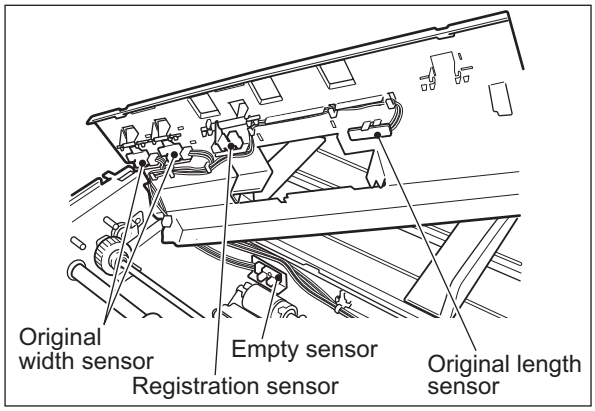


Fig.12-40

12.14 Read Sensor

(1) Remove 2 screws and take off the sub cover.

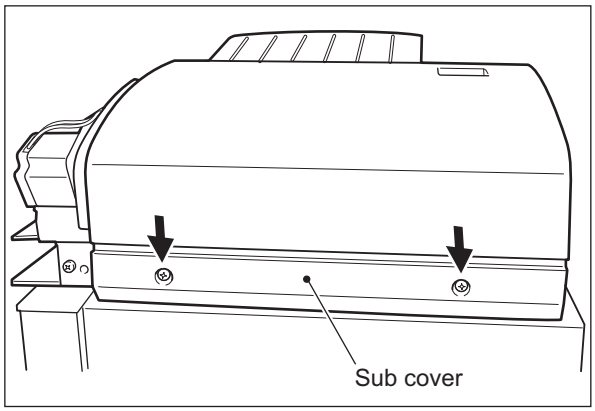


Fig.12-41

(2) Remove 1 screw and disconnect 1 connector, and then take off the read sensor.

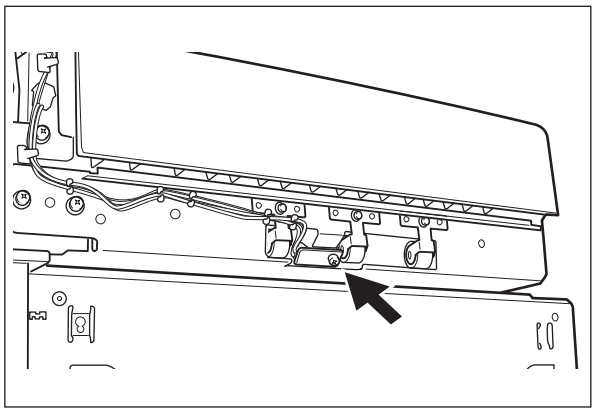


Fig.12-42

12.15 Exit Sensor

(1) Open the jam access cover and reverse guide.
(2) Remove 1 screw and take off the exit sensor with the bracket.

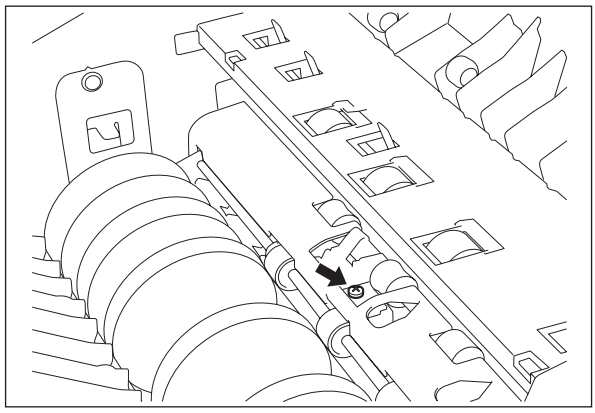


Fig.12-43

(3) Disconnect the connector and release the latches, and then take off the exit sensor from the bracket.

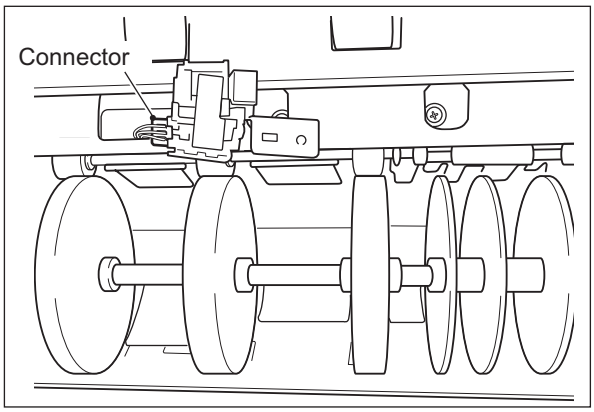


Fig.12-44

12.16 Reverse Sensor

(1) Remove 5 screws and take off the receiving tray.

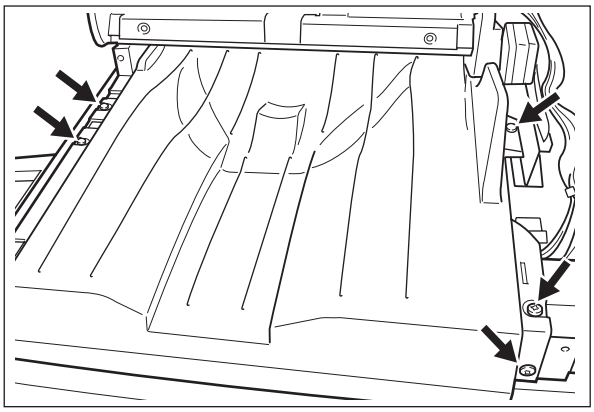


Fig.12-45

(2) Remove 2 screws fixing the bracket of the reverse sensor, and then pull out the bracket to the exit side.

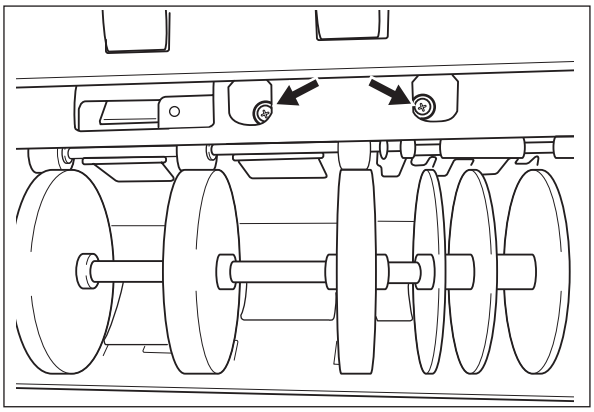


Fig.12-46

(3) Remove 1 screw and take off the reverse sensor from the bracket.
(4) Disconnect 1 connector to take off the reverse sensor.

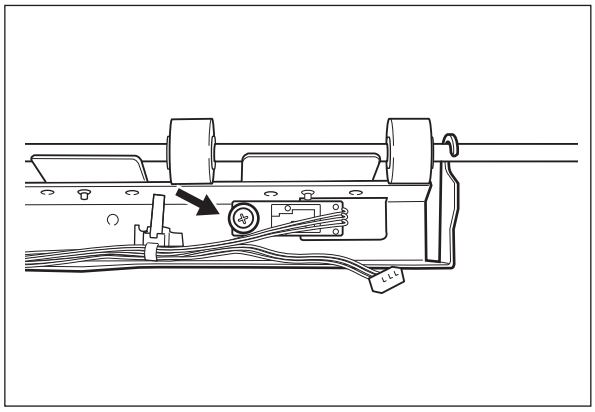


Fig.12-47

12.17 Tray Volume

(1) Take off the rear cover (Chapter 12.4 (1)).
(2) Disconnect 1 connector, remove 3 bands and release the harness from 2 clamps.

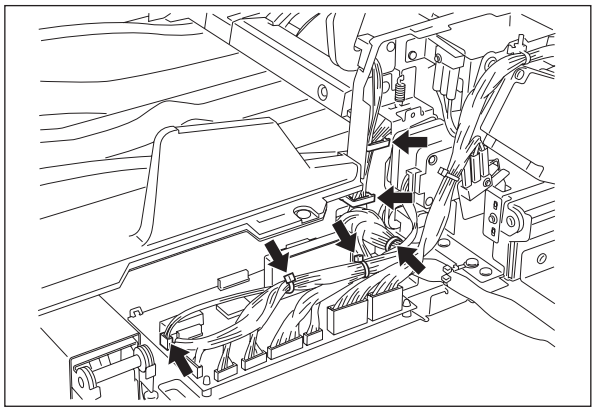


Fig.12-48

(3) Remove 1 screw and release the original tray support.
(4) Shift the original tray unit to the rear side to take it off.

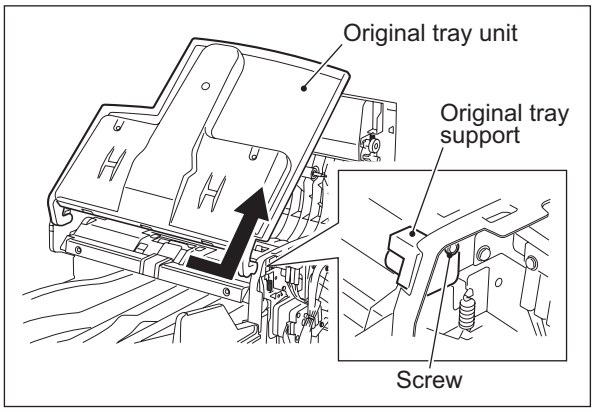


Fig.12-49

(5) Remove 3 screws and take off the tray lower cover.

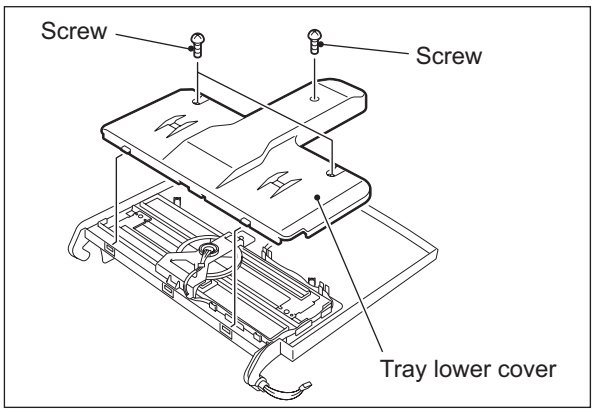


Fig.12-50

(6) Disconnect the connector and release the harness from the clamp.
(7) Remove the screw, release the hook and take off the tray volume assembly.
(8) Pull out the original guide gear.

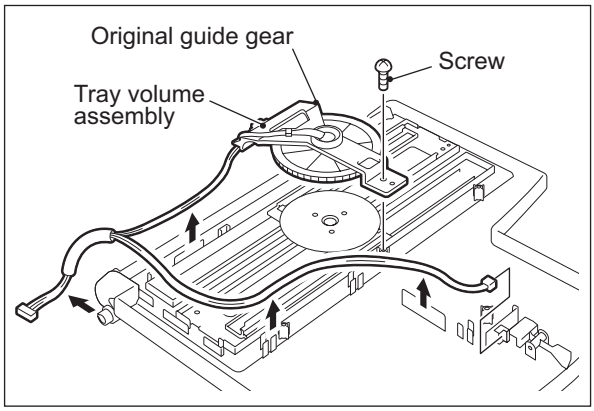


Fig.12-51

(9) Remove the hexagon nut and washer, and take off the tray volume.

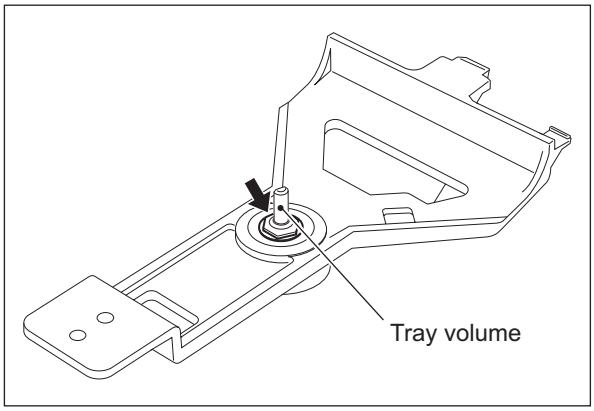


Fig.12-52

Notes:

Make sure the following items for assembling;

1. Extend the original guide to the limit.
2. Match the arrow mark (↑) of the sensor holder with that of the original guide gear.
3. Match the cutting section with the mark of the original guide gear.
4. Keep the harness in the clamp.

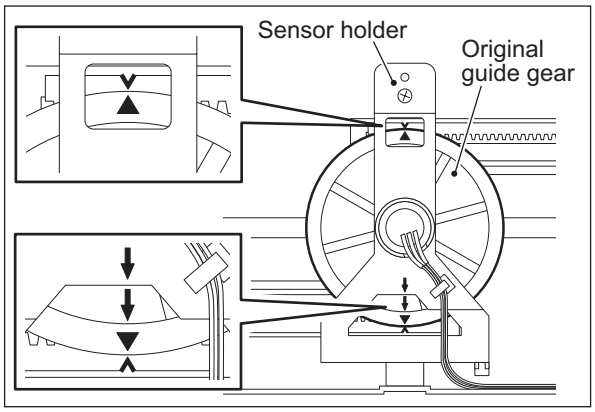


Fig.12-53

13. ADJUSTMENT

The adjustment items for the RADF are as follows.
They are performed as required in case a transport defect or a jam occurs.
Refer to the relevant adjustment item.

- Adjustment of RADF position
  It is mainly performed at the installation. It is also required when the RADF is dislocated for some reason such as moving the equipment.

- Adjustment of RADF height
  It is mainly performed at the installation. It is also required when the RADF is dislocated for some reason such as moving the equipment.

- Adjustment of skew
  It is performed when an image skew occurs.

  Note:
  Check if the image adjustment for the equipment is performed properly before this adjustment.
  Check if the RADF position and height are adjusted properly.

- Automatic adjustment of sensors and initialization of EEPROM
  They are performed when any of the PC board, original length sensor, read sensor, reverse sensor is replaced with a new one.

- Adjustment of tray volume
  Adjust when replacing the PC board and the tray volume, and when initializing EEPROM.

- Adjustment of reverse solenoid
  It is performed when the reverse flapper is not pulled completely.

- Adjustment of RADF opening/closing switch
  It is for adjusting the switch detecting the RADF opening/closing.

- Adjustment of RADF opening/closing sensor
  It is for adjusting the sensor detecting the RADF opening/closing.

13.1 Adjustment of RADF Position

It is mainly performed at the installation. It is also required when the RADF is dislocated for some reason such as moving the equipment.
Remove the platen sheet during adjustment.

(1) Open the RADF and then attach 2 positioning pins to the equipment.
(The positioning pins have been attached at the rear of the right-hand hinge of the RADF.)

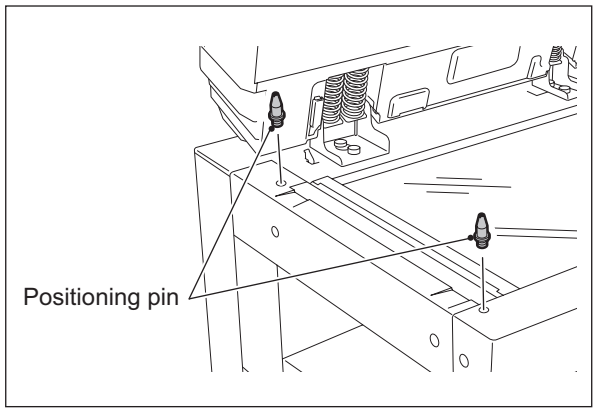


Fig.13-1

(2) Close the RADF to check that the positioning pins fit smoothly into the holes on the RADF. If they do not, adjust them according to the following procedure.

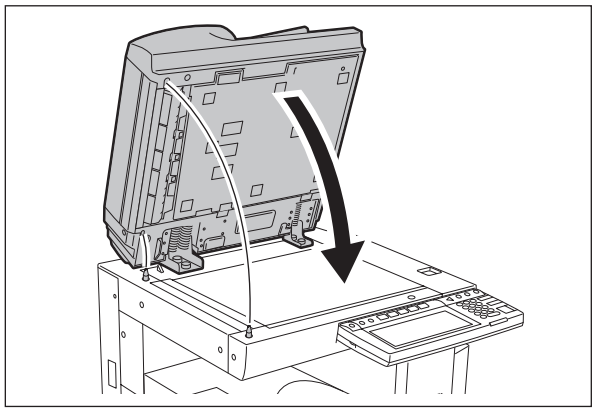


Fig.13-2

(3) Loosen the stepped screw 1 turn and 2 screws on the adjustment plate a half turn (status of temporary fixing).

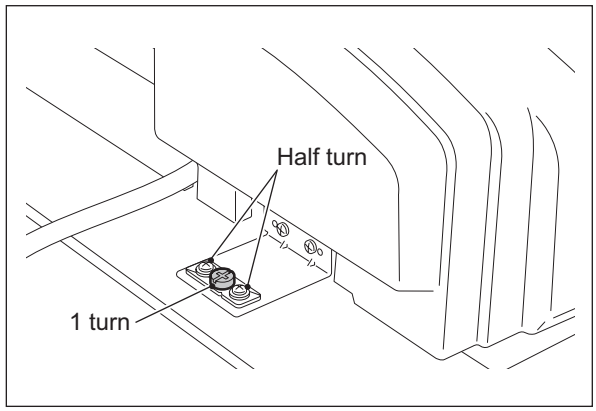


Fig.13-3

(4) Remove the stepped screw at the rear of right-hand hinge.

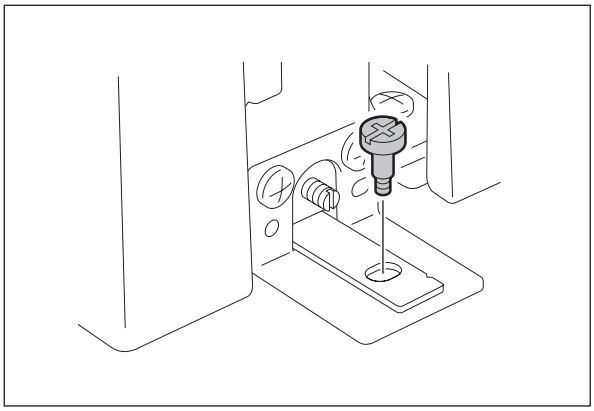


Fig.13-4

(5) Open the RADF, and then loosen 2 hand screws 1 turn (status of temporary fixing).

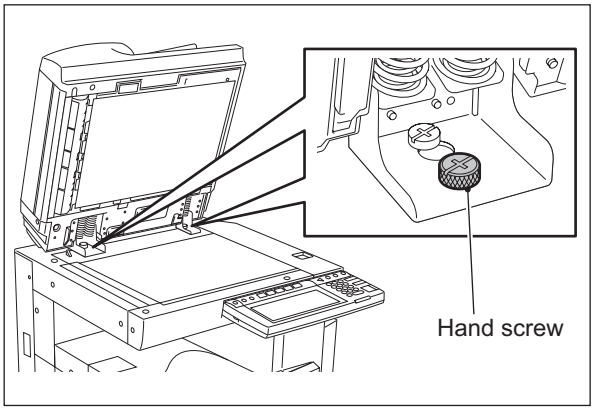


Fig.13-5

(6) Remove the positioning pin at the front side. Close the RADF to fit the positioning pin into the hole at the rear side of the RADF. While peering inside from the front side, fit the positions of the pin and hole by moving the RADF right and left.

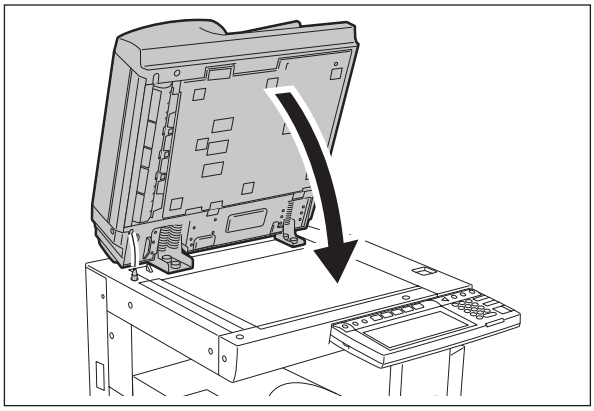


Fig.13-6

(7) Tighten the positioning pin at the front side. Close the RADF to fit the positioning pin into the hole at the front side of the RADF. (For the front side, adjust the RADF position all around.)

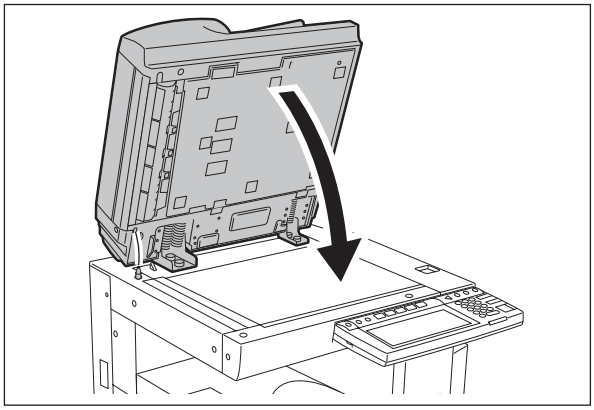


Fig.13-7

(8) While peering inside from the left side, close the RADF. Check the positions of the holes of the RADF and pins, and then fit their positions by moving the RADF back and forth. (For the front side, also adjust the RADF position right and left.) Make sure not to dislocate the positions of the pin and hole at the rear side.

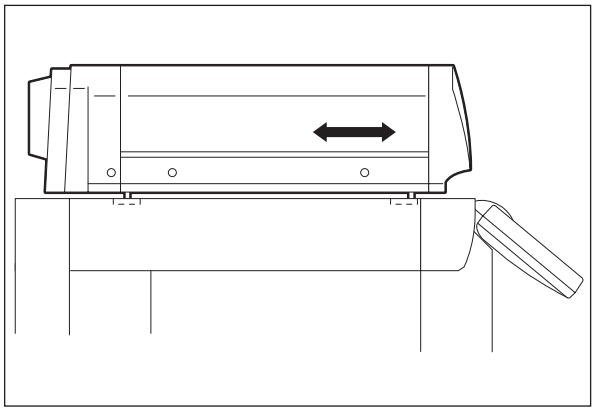


Fig.13-8

(9) Open the RADF to tighten 2 hand screws. Close the RADF and then check again that the positioning pins fit smoothly into the holes on the RADF.

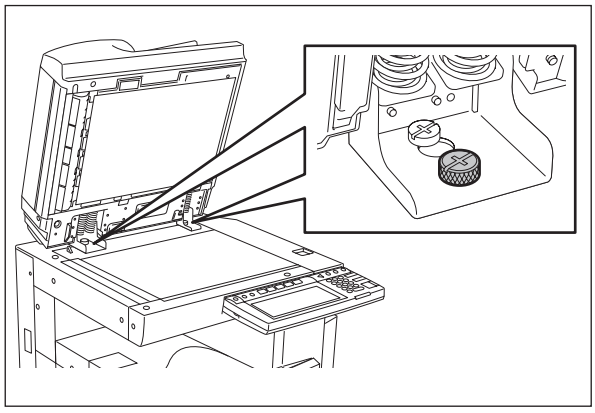


Fig.13-9

(10) Fit the hinge hole into the hole of the equipment at the rear right of the RADF to tighten the stepped screw. If they do not fit, adjust the position of the hole by turning the screw of the adjustment plate.

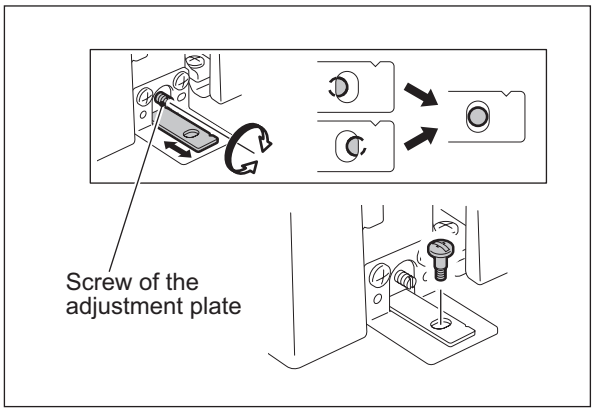


Fig.13-10

(11) Tighten the stepped screw and 2 screws on the adjustment plate.
Open and close the RADF to check again that the positioning pins fit smoothly into the holes on the RADF. Remove the positioning pins after checking it.
(Replace the positioning pins at the rear of the right-hand hinge of the RADF.)

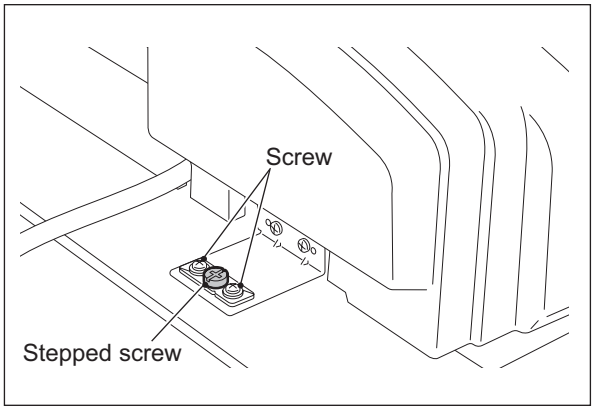


Fig.13-11

(12) Place the platen sheet on the original glass with the semi round cutout toward you.
Align the platen sheet against the left and rear side of the original glass. Close the RADF slowly. Open the RADF to check that the platen sheet is correctly attached.

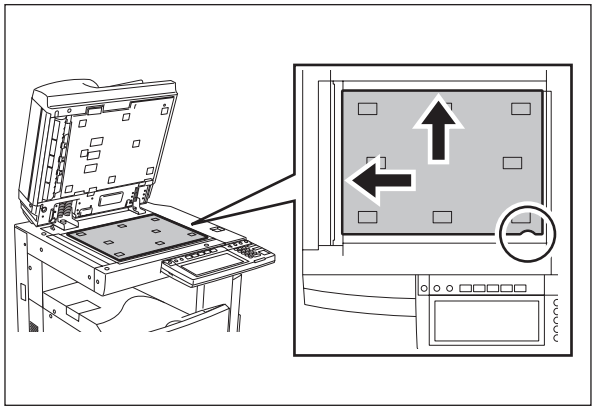


Fig.13-12

13.2 Adjustment of RADF Height

It is mainly performed at the installation. It is also required when the RADF is dislocated for some reason such as moving the equipment.
Perform the following adjustment by using the screw of the left and right hinge.

Note:
Perform this adjustment after “13.1 Adjustment of RADF position”.
Turn the exposure lamp ON during the gap check. (Test Mode: 03-267)

(1) Adjustment standard:
Adjust the height so that the platen guide front holder touches the ADF original glass.
Adjust the height so that the gap between the platen guide rear holder and the ADF original glass becomes 0.5 mm ± 0.3.

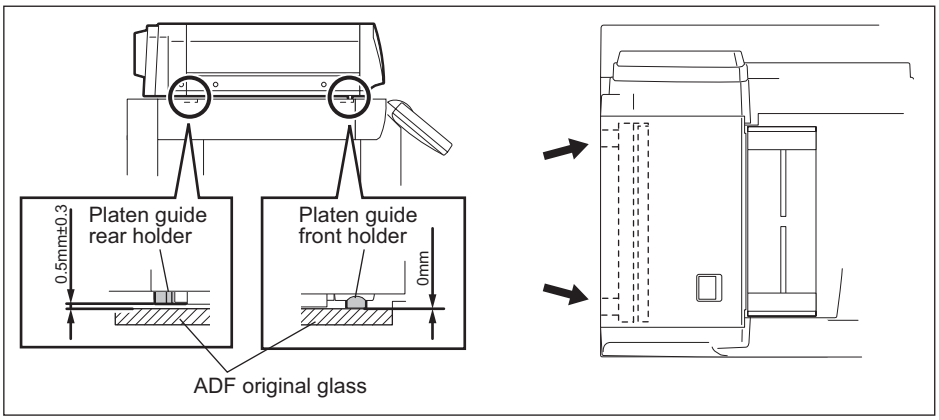


Fig.13-13

(2) Adjust the height by turning the height adjusting screw on the left hinge.
Clockwise: The height of the hinge becomes high.
Counterclockwise: The height of the hinge becomes low.

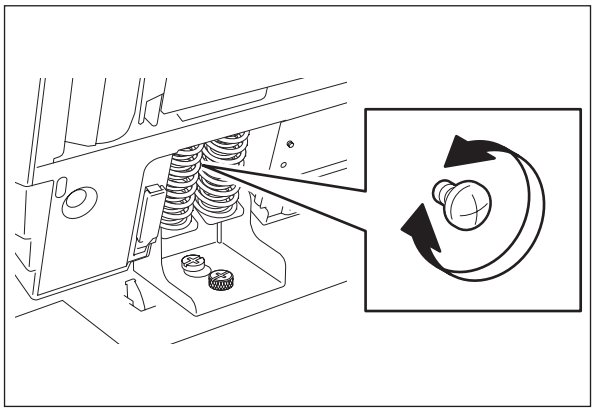


Fig.13-14

(3) Adjust the height by turning the height adjusting screw on the right hinge.
Clockwise: The height of the hinge becomes high.
Counterclockwise: The height of the hinge becomes low.

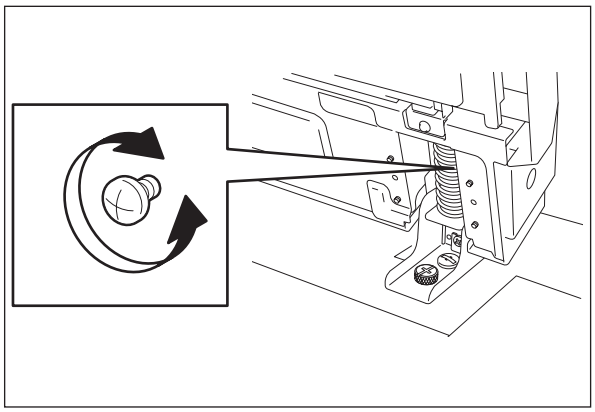


Fig.13-15

13.3 Adjustment of Skew

When an image skew occurs, adjust it according to the following steps, Step 1 → Step 2 → Step 3.

Note:

Perform this adjustment after confirming that the equipment has been adjusted properly.
Prior to this adjustment, adjustment of RADF position and height are needed to be adjusted.

Step 1

Case A: Adjust the aligning adjustment position to the rear side "-" of the original (Chap. 13.5).

Case B: Adjust the aligning adjustment position to the rear side "+" of the original (Chap. 13.5).

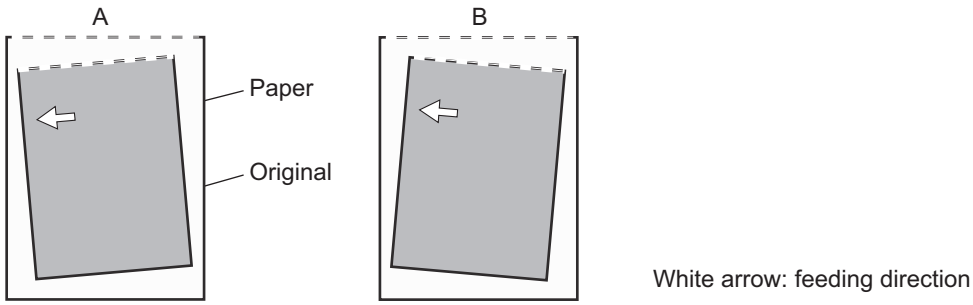


Fig.13-16

Step 2

Case C: Loosen the fixing screw and hand screw of the right side hinge and then turn the adjustment screw counterclockwise.

Case D: Loosen the fixing screw and hand screw of the right side hinge and then turn the adjustment screw clockwise.

Note:

When adjusting, refer to the hinge position (scribed line) and be sure not to move it from the hinge position ±0.5 mm or further. Otherwise, image failures such as a jitter may occur.

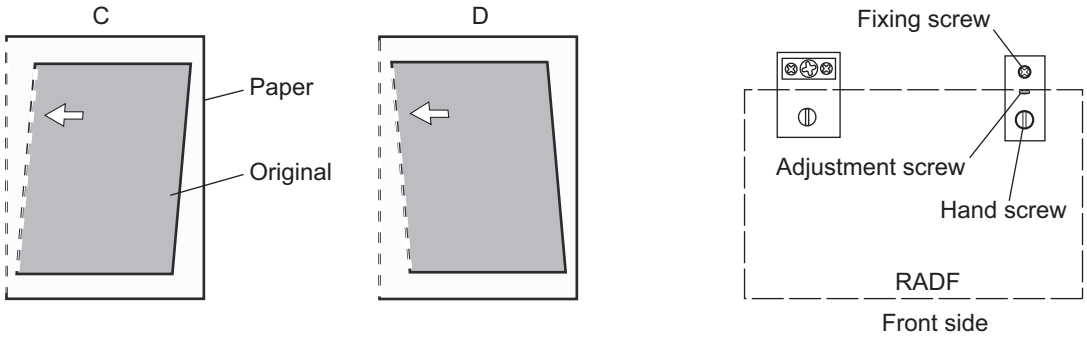


Fig.13-17

Step 3

Case E: Adjust the reverse aligning adjustment position to the rear side “-” of the original (Chap. 13.6).

Case F: Adjust the reverse aligning adjustment position to the rear side “+” of the original (Chap. 13.6).

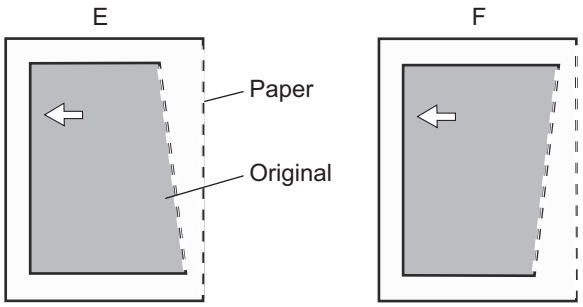


Fig.13-18

13.4 Automatic Adjustment of Sensors and Initialization of EEPROM

When any of the PC board, original length sensor, read sensor, reverse sensor is replaced with a new one, make sure to perform the initialization of EEPROM and adjustment of sensors by input (Adjustment Mode: 05) from the equipment.
Also, make sure to adjust the tray volume when the initialization of EEPROM and automatic sensor adjustment have been performed.
Perform them after removing all originals on the sensor and closing the RADF.
Refer to the “Adjustment Mode (05)” of the Service Handbook for the details.
Errors such as paper jamming may occur if the EEPROM is not initialized and the sensors are not adjusted after the above mentioned parts were replaced.

13.5 Adjustment of Aligning

Adjust the aligning according to Step 1 of 13.3.

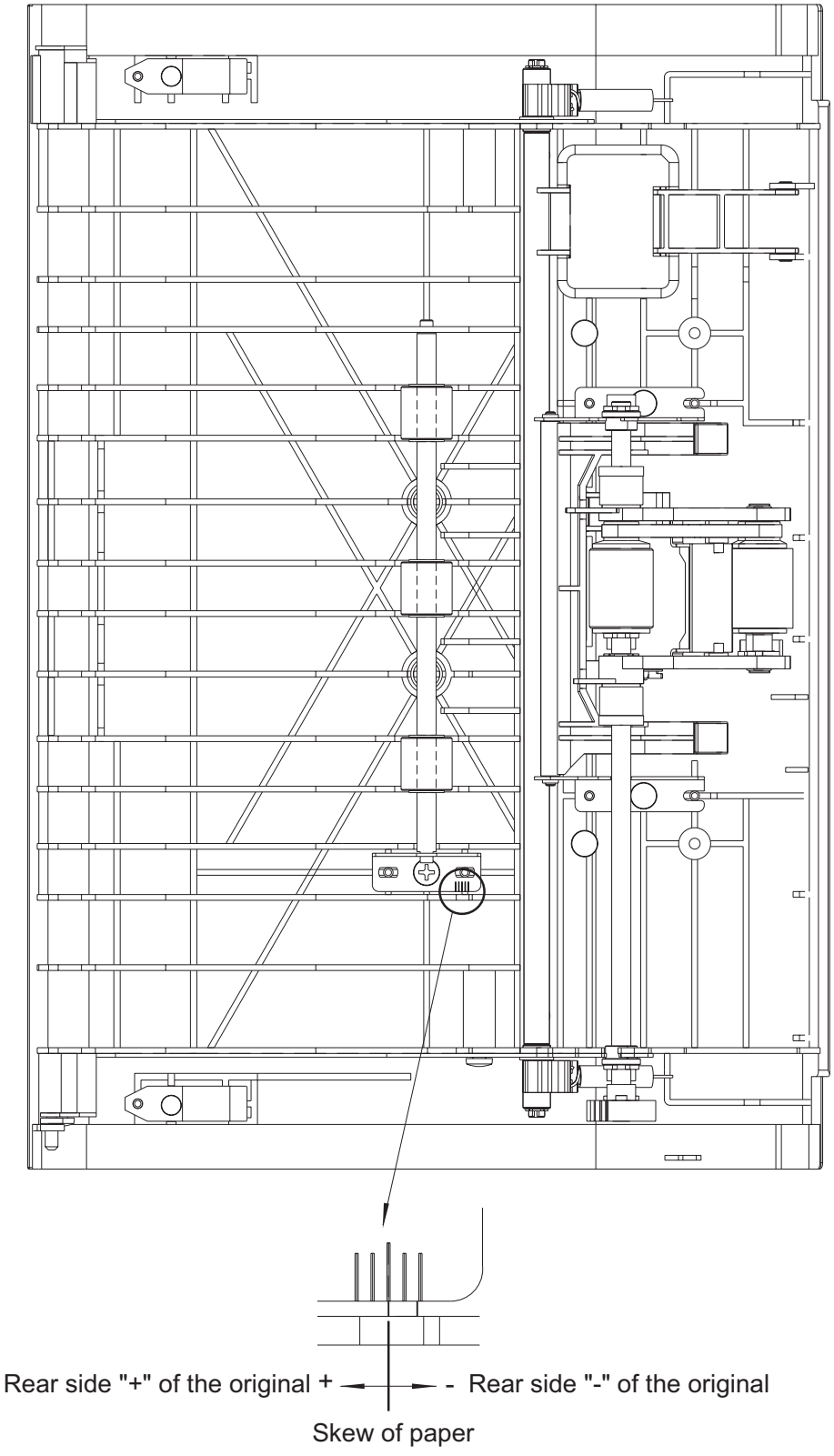


Fig.13-19

13.6 Adjustment of Aligning at Reversing

Adjust the aligning according to Step 3 of 13.3.

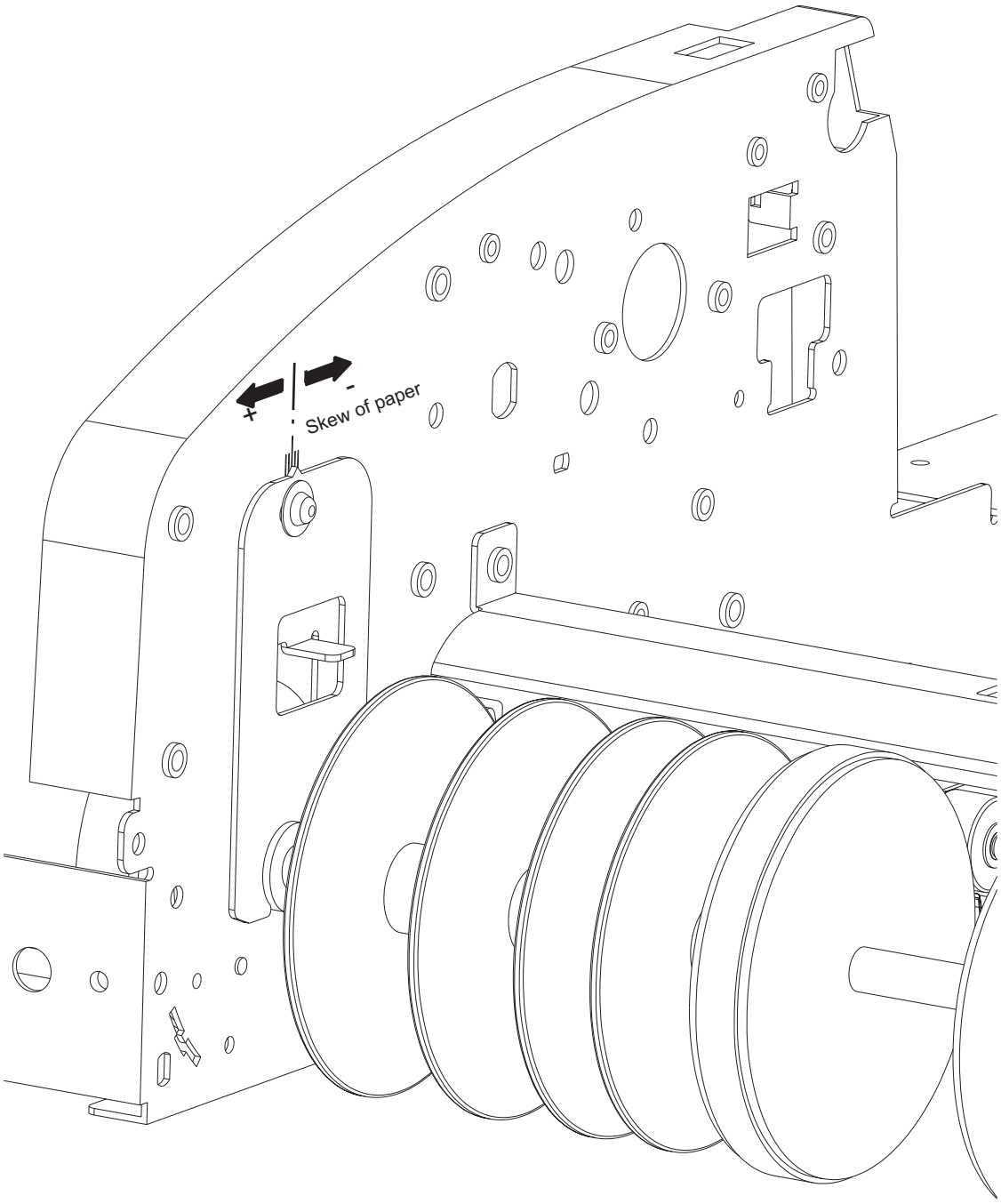


Fig.13-20

13.7 Adjustment of Reverse Solenoid

When operating the reverse solenoid, adjust it if the position of the flapper lever is out of the following dimension.

Gap between A of the front frame and the flapper lever “C”: 0.5 mm to 2.0 mm

Adjusting procedure

(1) Remove the screw on the left and take off the plate spring.

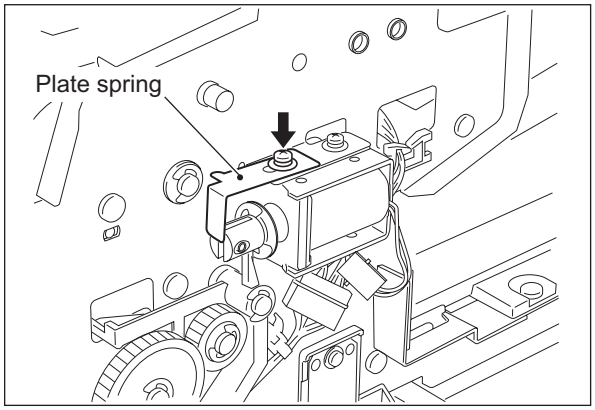


Fig.13-21

(2) Align B of the front frame with the edge of the reverse solenoid, and temporarily fix the reverse solenoid with the screw on the right.

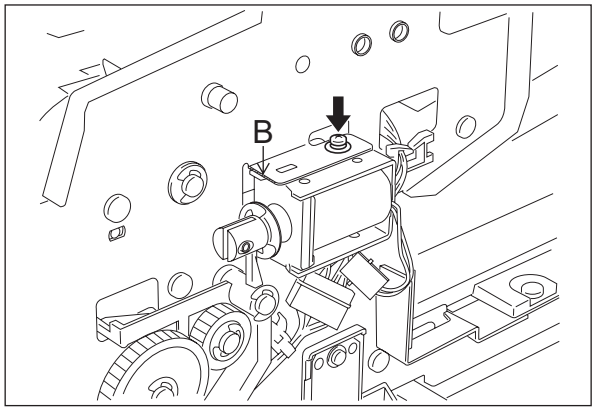


Fig.13-22

(3) While the plunger of the reverse solenoid is put in the position to be turned ON (by pressing it in the direction of an arrow), loosen the screw on the right to adjust the reverse solenoid so that the gap (C) between A of the front frame and the flapper lever is 0.5 mm to 2.0 mm.

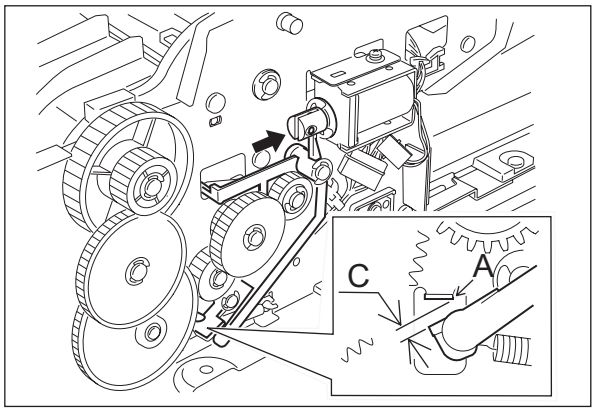


Fig.13-23

(4) Fix the plate spring temporarily with the screw on the left. Then press the plate spring slightly in the direction of an arrow and tighten the screw in the position where the gap (D) between the plunger and the flapper lever is eliminated.

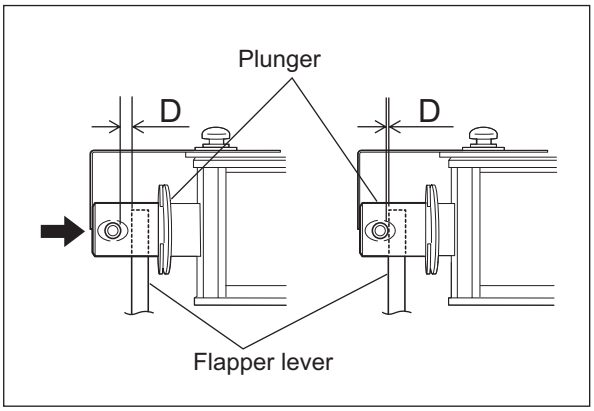


Fig.13-24

13.8 Adjustment of RADF Opening/Closing Switch

Adjust the bracket position so that the switch is turned ON when the height A becomes 40-45 mm (within the empty weight falling limit).

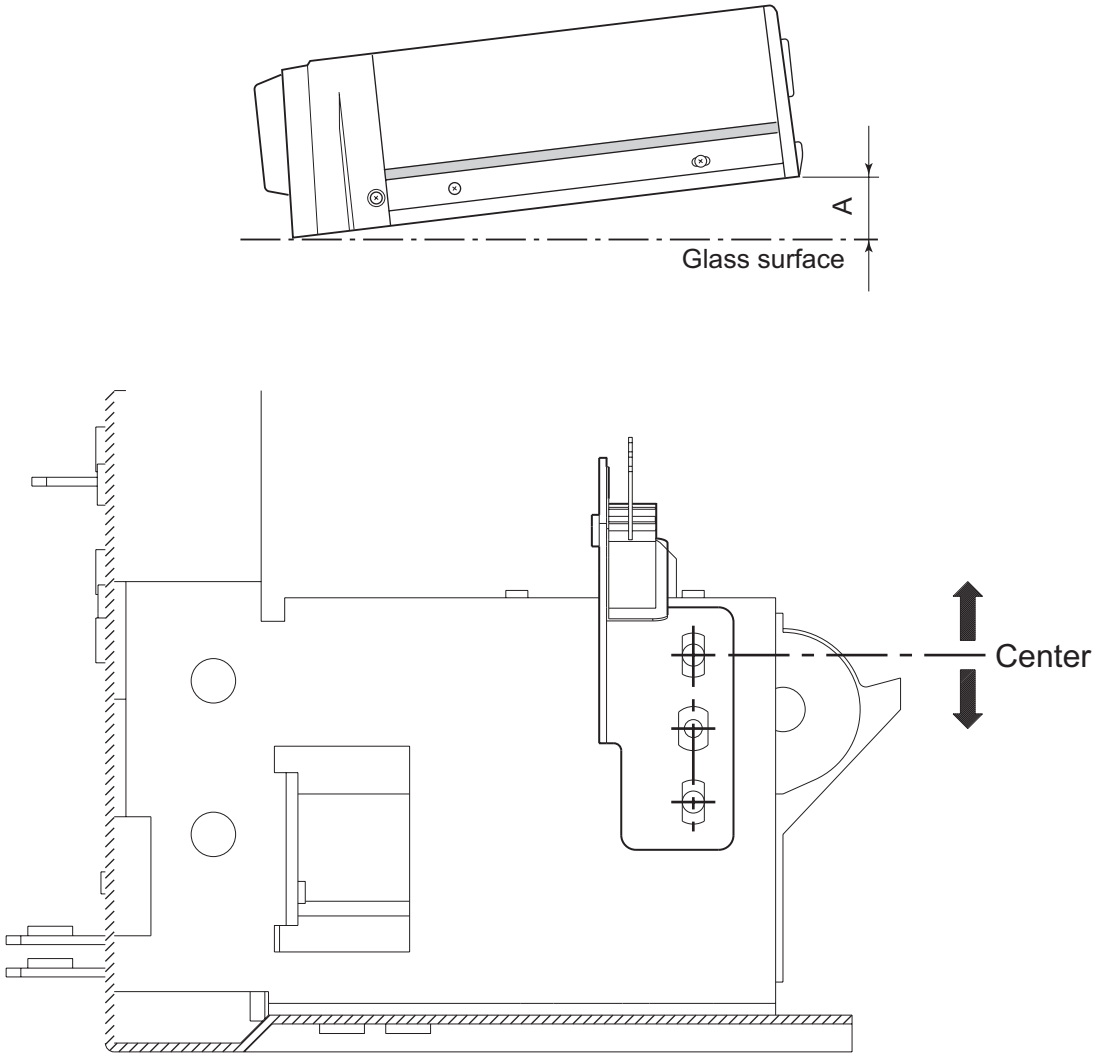


Fig.13-25

13.9 Adjustment of RADF Opening/Closing Sensor

Adjust the bracket position so that the sensor is turned ON when the height A becomes 30-35 mm (within the empty weight falling limit).

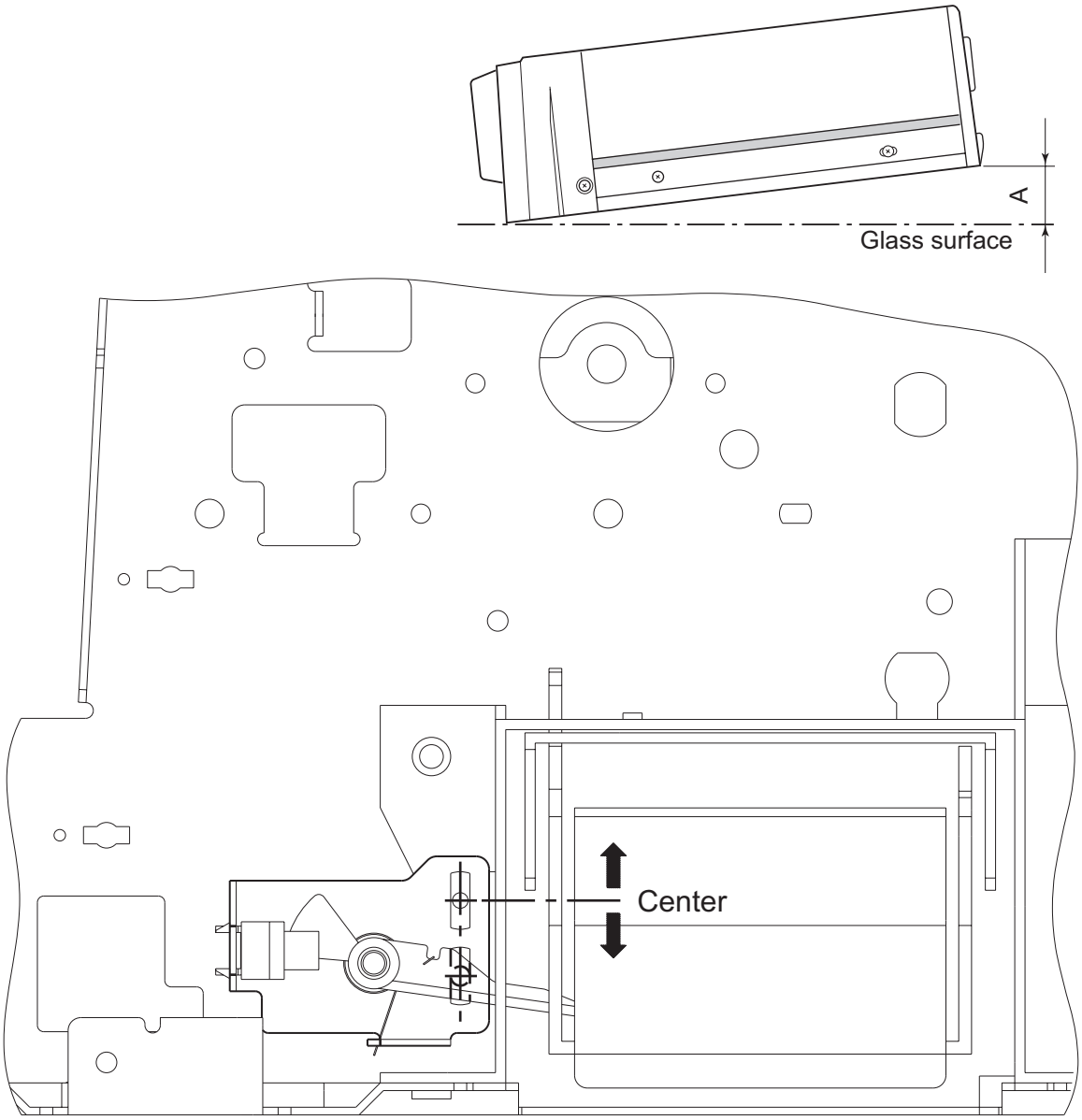


Fig.13-26

13.10 Attachment of Mylars

Note:
Clean the attachment surface with alcohol and then attach them.

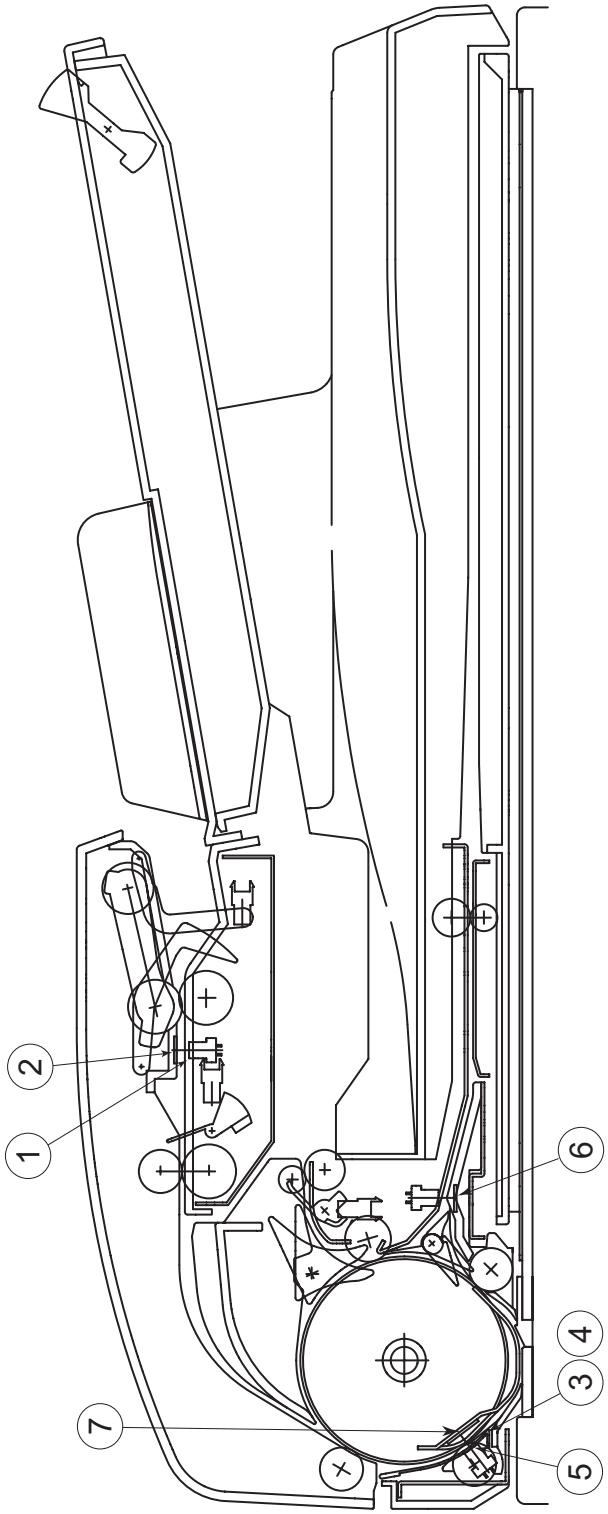


Fig.13-27

1) Sensor cover Mylar

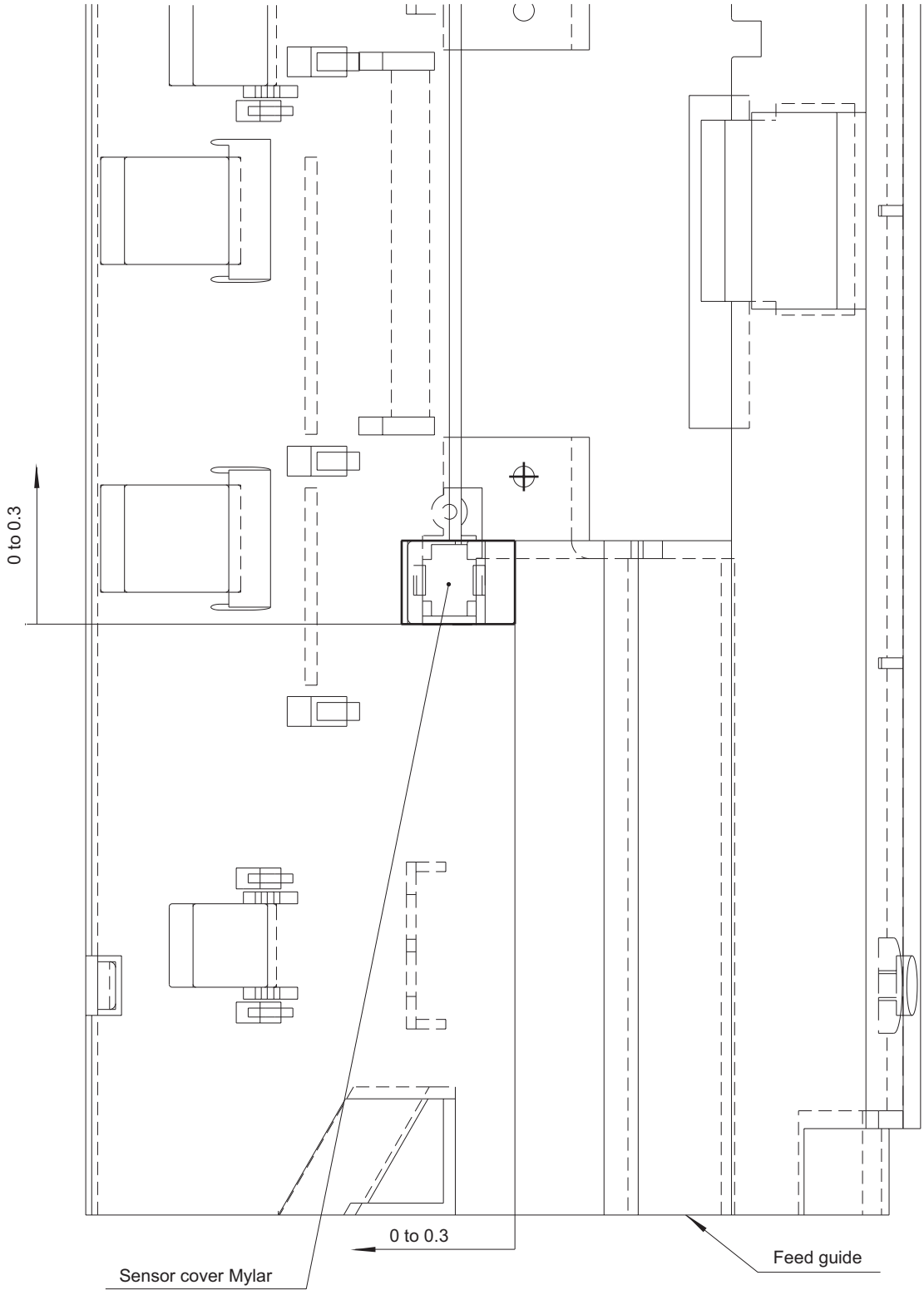


Fig.13-28

2) Sensor mirror Mylar

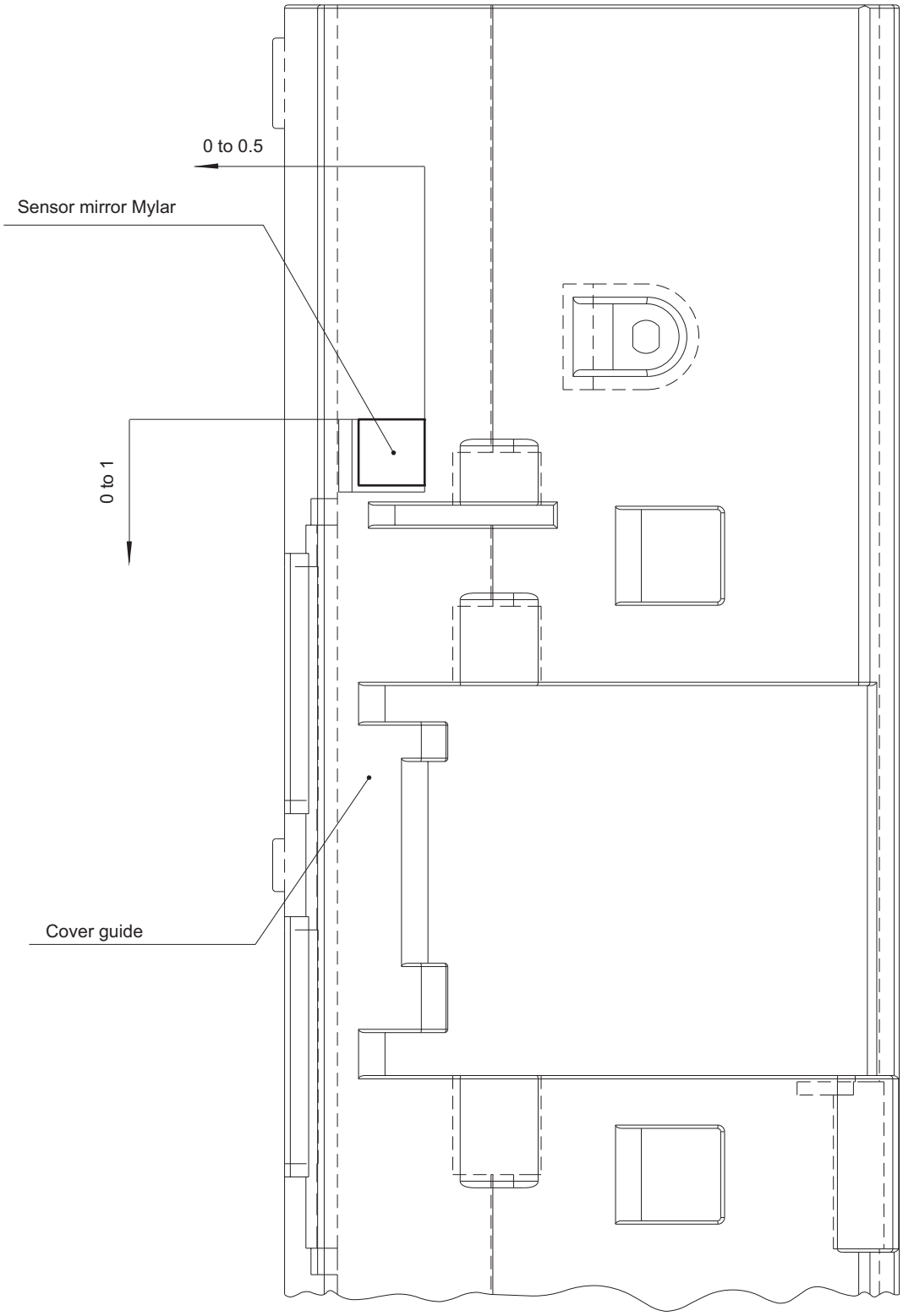


Fig.13-29

3) Read guide Mylar-1

4) Read guide Mylar-2

5) Sensor Mylar

Clean the attachment surface with alcohol and then attach the read guide Mylar-1, read guide Mylar-2, and sensor Mylar to the read guide.
Make sure there are no wrinkles or bubbling on the attached Mylars.

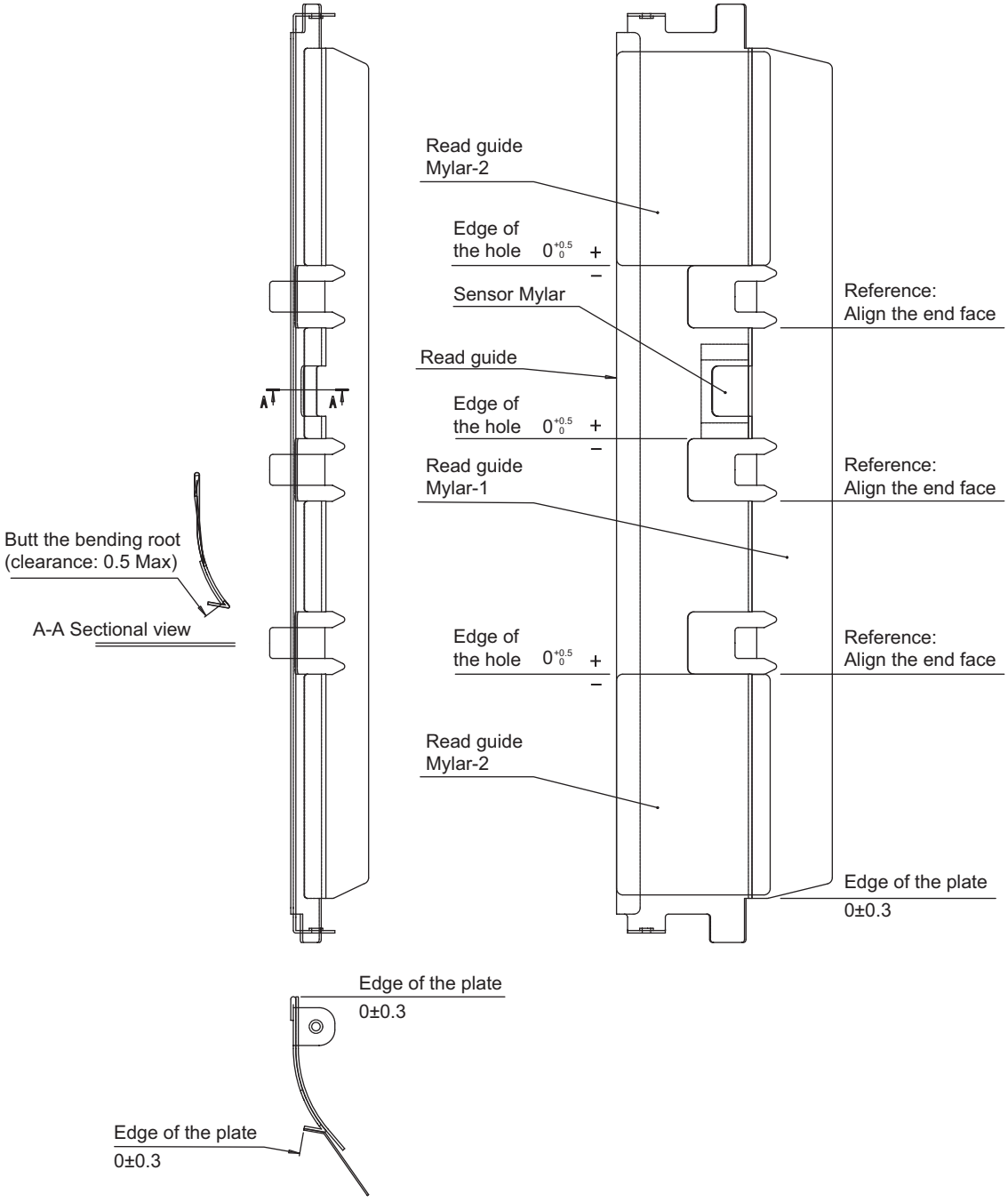

Read guide Mylar-2
Edge of the hole $0^{+0.5}_{0}$ + −
Sensor Mylar
Read guide
Edge of the hole $0^{+0.5}_{0}$ + −
Read guide Mylar-1
Edge of the hole $0^{+0.5}_{0}$ + −
Read guide Mylar-2
Reference: Align the end face
Reference: Align the end face
Reference: Align the end face
Edge of the plate 0±0.3
Butt the bending root (clearance: 0.5 Max)
A-A Sectional view
Edge of the plate 0±0.3
Edge of the plate 0±0.3

Fig.13-30

6) Sensor mirror Mylar-2

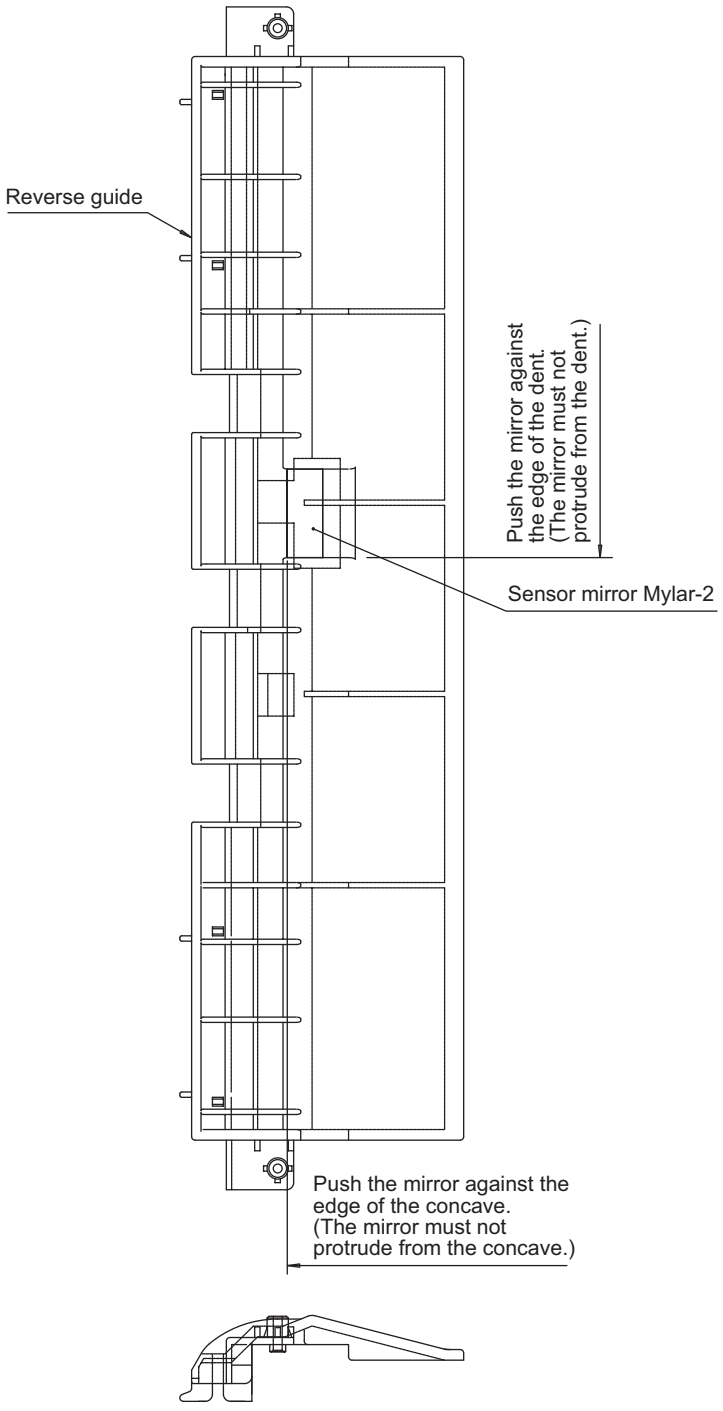

Reverse guide
Push the mirror against the edge of the dent. (The mirror must not protrude from the dent.)
Sensor mirror Mylar-2
Push the mirror against the edge of the concave. (The mirror must not protrude from the concave.)

Fig.13-31

7) Sensor mirror Mylar-3

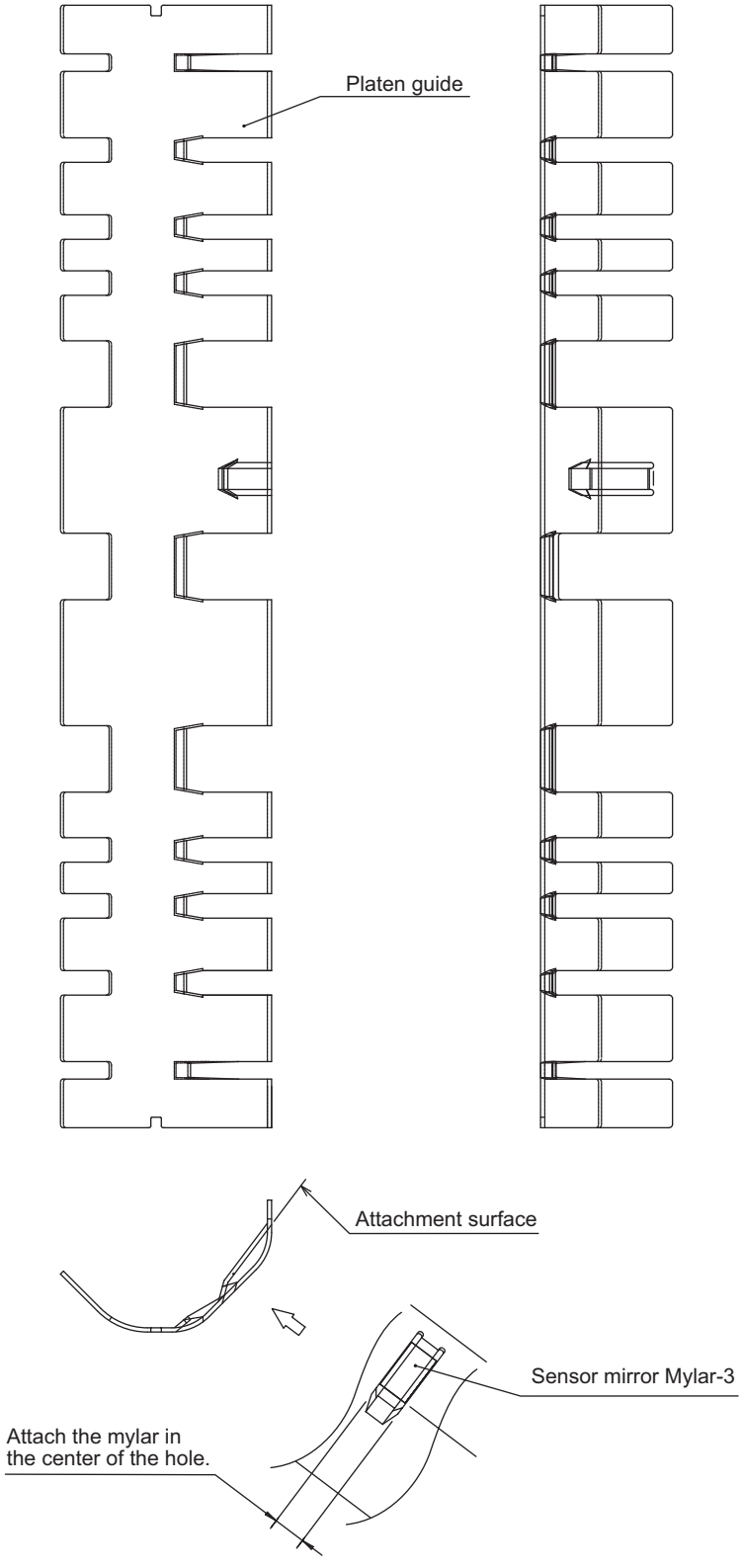


Fig.13-32

13.11 Adjustment of Tray Volume

Adjust in the adjustment mode (05).

(1) Turn the power ON while pressing “0” and “5”.
(2) Narrow the original guide to the limit.
(3) Input the code “367”.
(4) Press the [START] button.

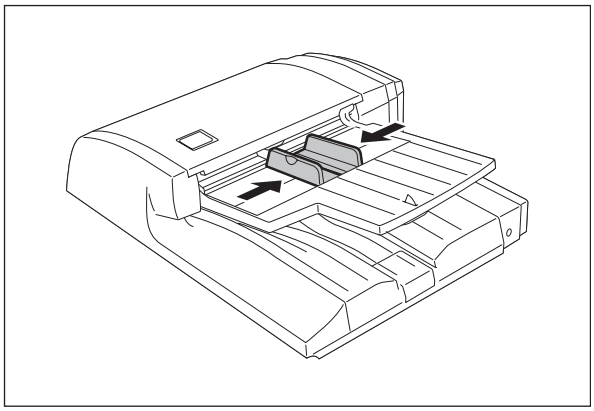


Fig.13-33

(5) Extend the original guide to the limit.
(6) Input the code “368”.
(7) Press the [START] button
(8) Turn the power OFF.

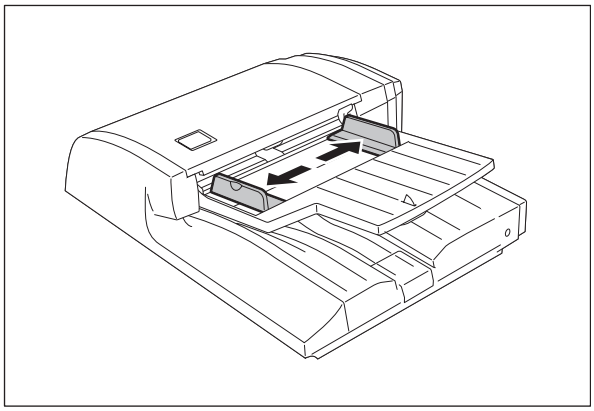


Fig.13-34

14. SERVICE

14.1 Troubleshooting for Mechanical Errors

1) More than one original is transported simultaneously

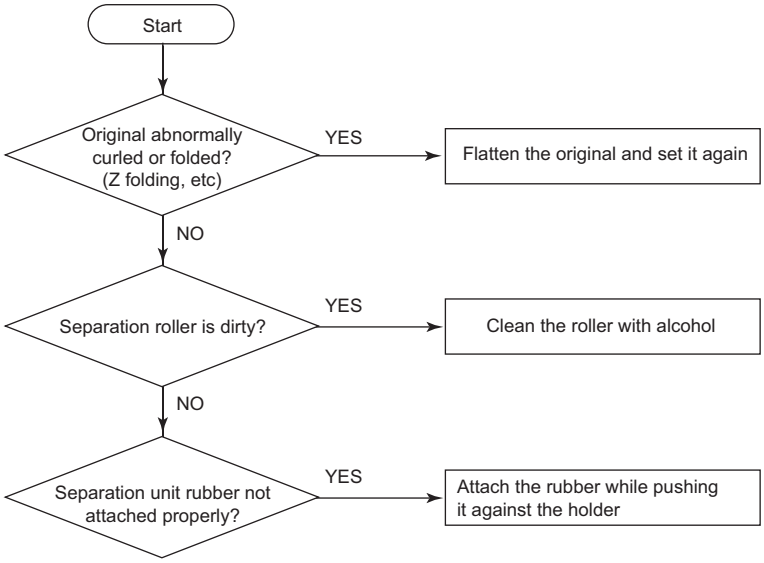


Fig.14-1

2) Original is not transported to registration roller

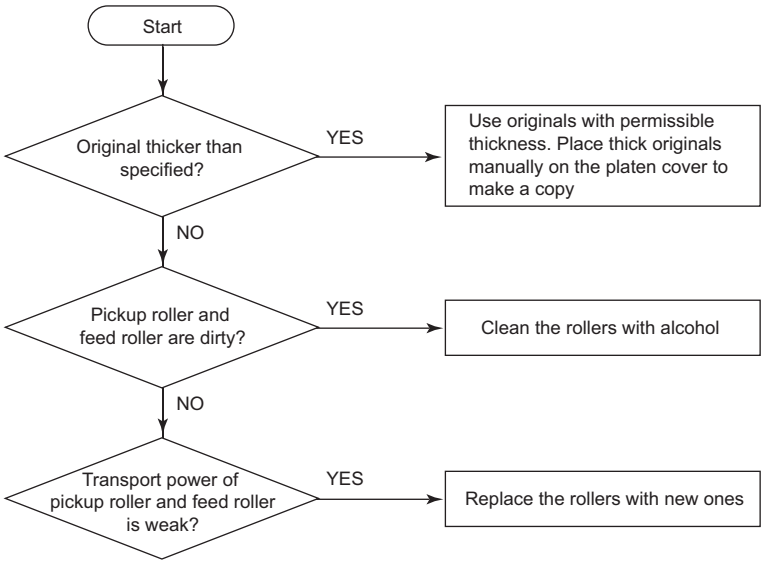

Start
Original thicker than specified?
YES
Use originals with permissible thickness. Place thick originals manually on the platen cover to make a copy
NO
Pickup roller and feed roller are dirty?
YES
Clean the rollers with alcohol
NO
Transport power of pickup roller and feed roller is weak?
YES
Replace the rollers with new ones

Fig.14-2

3) Leading edge of original is skewed

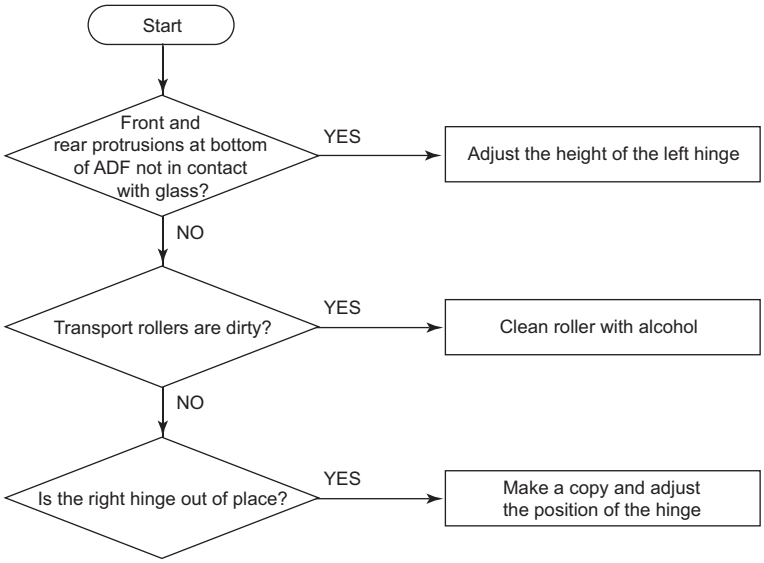

Start
Front and rear protrusions at bottom of ADF not in contact with glass?
YES
Adjust the height of the left hinge
NO
Transport rollers are dirty?
YES
Clean roller with alcohol
NO
Is the right hinge out of place?
YES
Make a copy and adjust the position of the hinge

Fig.14-3

4) Edges of original and copied image are shifted

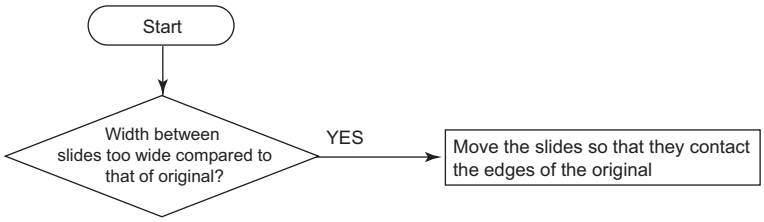

Start
Width between slides too wide compared to that of original?
YES
Move the slides so that they contact the edges of the original

Fig.14-4

5) Black streaks appear on copied image

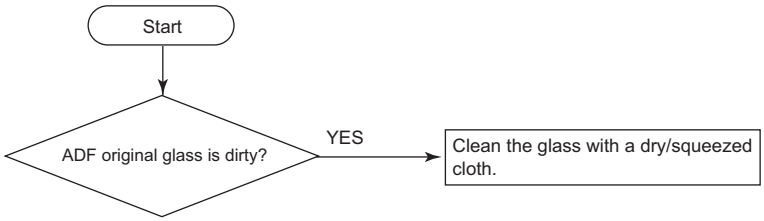


Fig.14-5

Note:

When black streaks still appear even if the ADF original glass is cleaned (e.g. in case the stain adheres and cannot be removed), shifting the carriage position during scanning from RADF (Adjustment Mode 05-359) is one of the solutions. Make sure to perform “RADF leading edge position adjustment” (05-365 and 05-366) after the setting value of 05-359 has been changed. When the setting value of 05-359 has been changed, the brightness of the copied image changes accordingly. Change the setting value along with checking the copied image. (The range of the recommended setting values is within ±10 bits.)

14.2 Troubleshooting for Electrical Errors

1) RADF does not work (except in the case of a paper jam or when the cover is open)

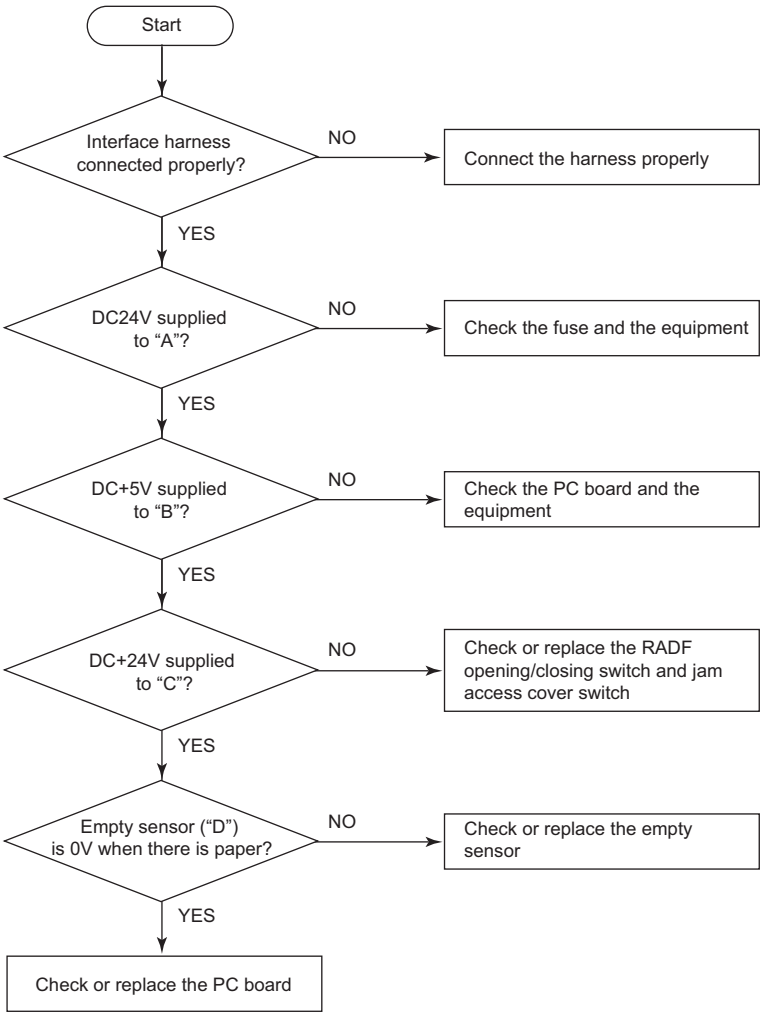


Fig.14-6

“A”	“B”	“C”	“D”
TP26	TP27 Pin5-CN1	TP30	TP16

2) Abnormality of motor

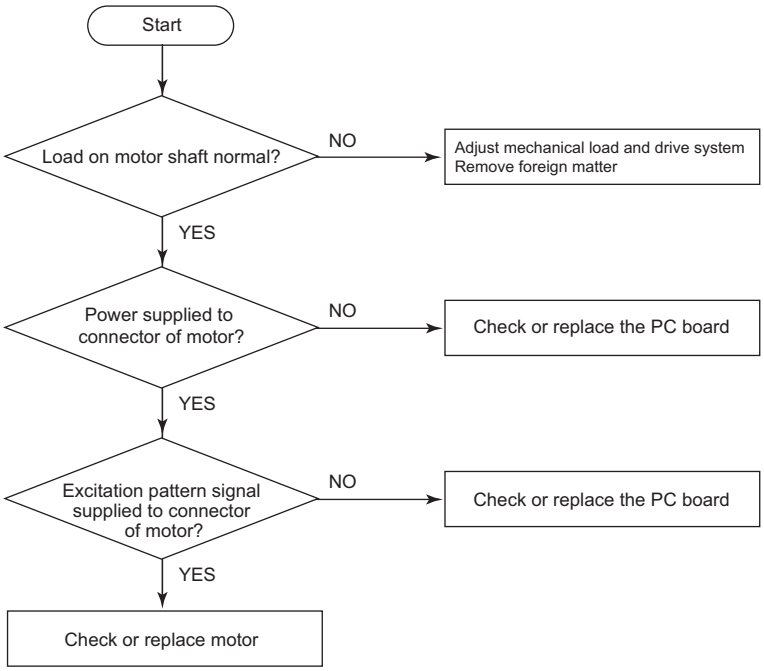


Fig.14-7

3) Communication error

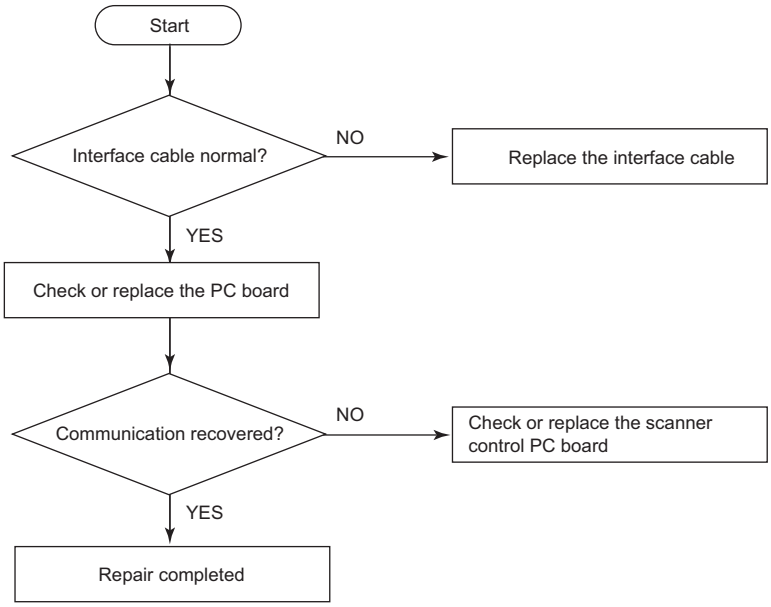


Fig.14-8

4) Size detection error

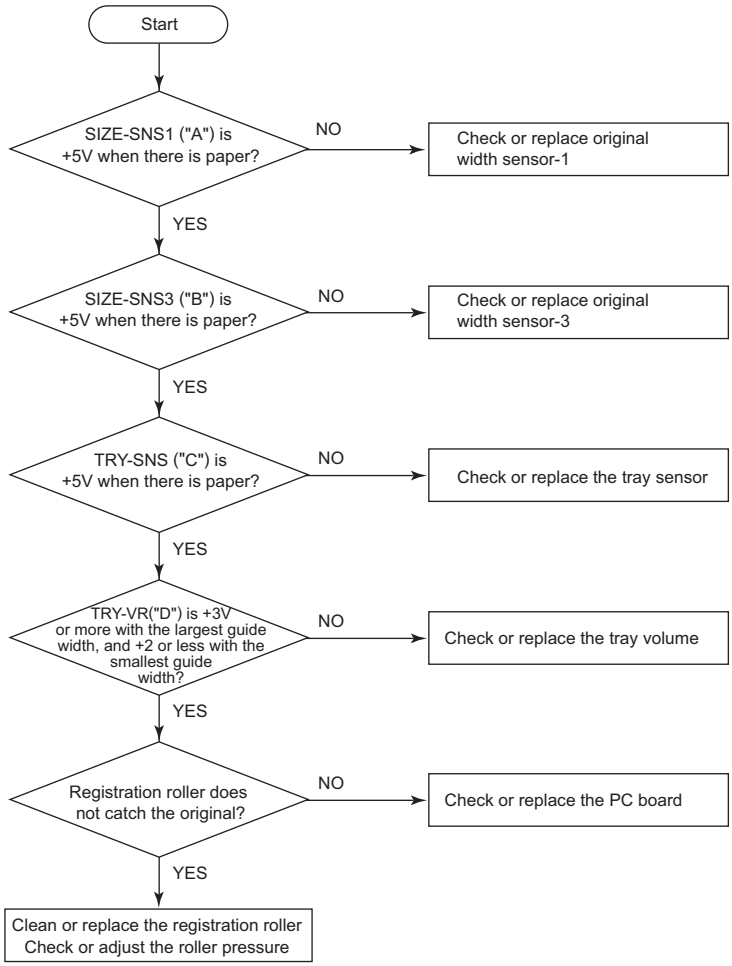

Start
SIZE-SNS1 ("A") is +5V when there is paper?
NO
Check or replace original width sensor-1
YES
SIZE-SNS3 ("B") is +5V when there is paper?
NO
Check or replace original width sensor-3
YES
TRY-SNS ("C") is +5V when there is paper?
NO
Check or replace the tray sensor
YES
TRY-VR("D") is +3V or more with the largest guide width, and +2 or less with the smallest guide width?
NO
Check or replace the tray volume
YES
Registration roller does not catch the original?
NO
Check or replace the PC board
YES
Clean or replace the registration roller
Check or adjust the roller pressure

Fig.14-9

"A"	**"B"**	**"C"**	**"D"**
TP19	TP21	TP17	TP65

14

5) Fan error

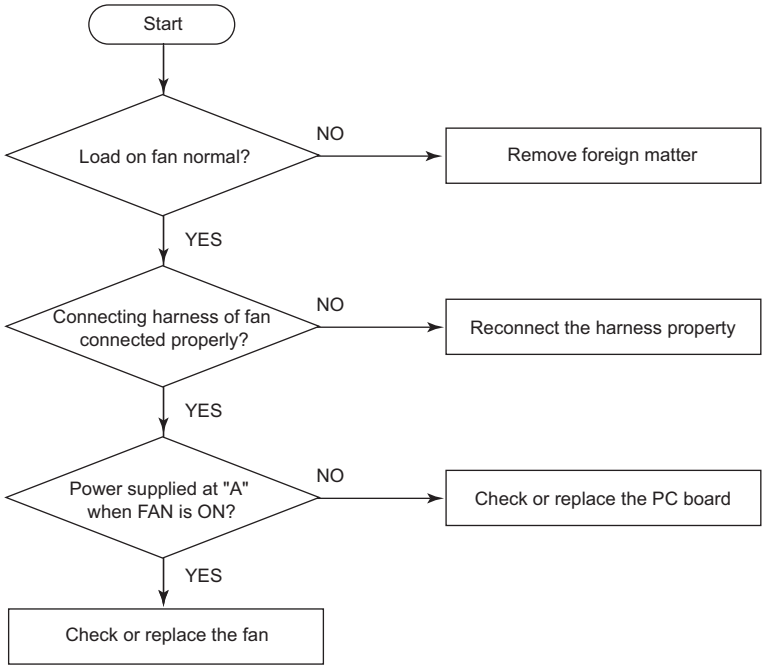


Fig.14-10

“A”
Pin1-CN9

15. ASSEMBLY OF PC BOARD

15.1 Assembly of PC Board

- Component side

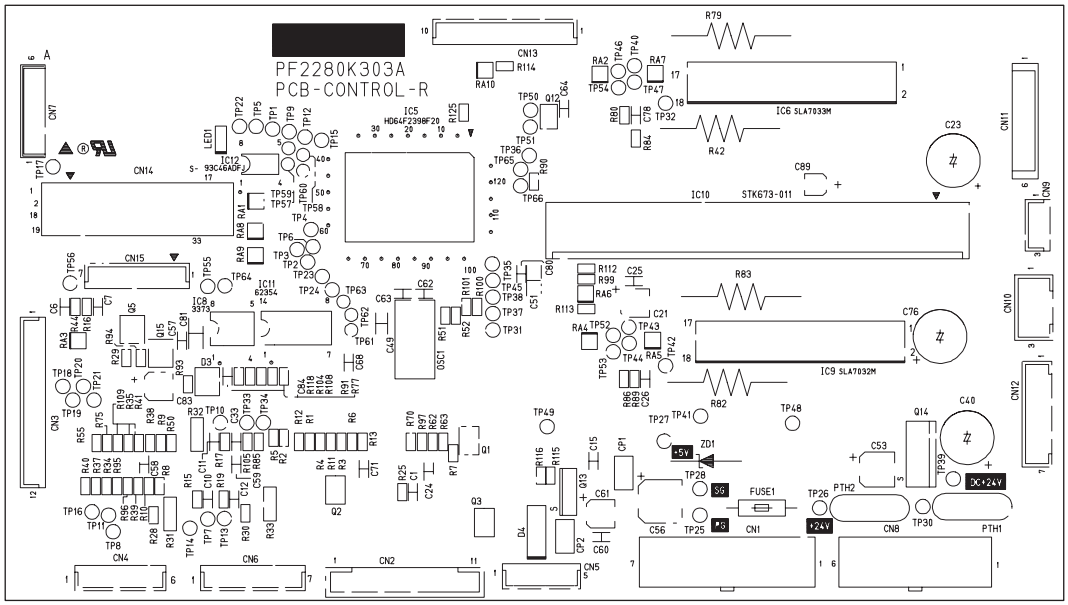


Fig.15-1

- Soldered side

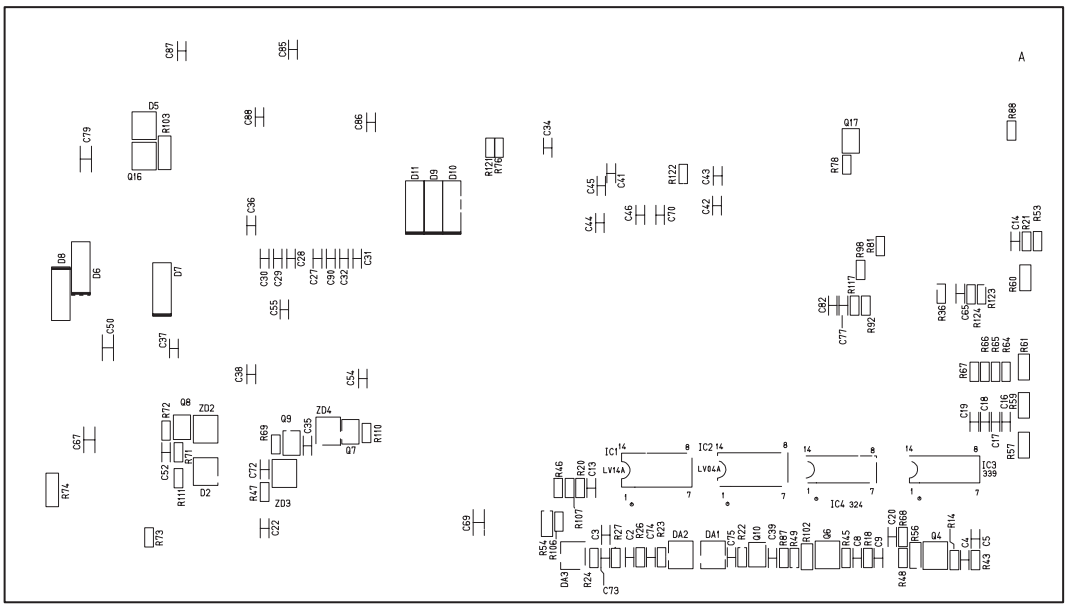


Fig.15-2

16. MAINTENANCE AND CHECKING

16.1 Periodic Maintenance

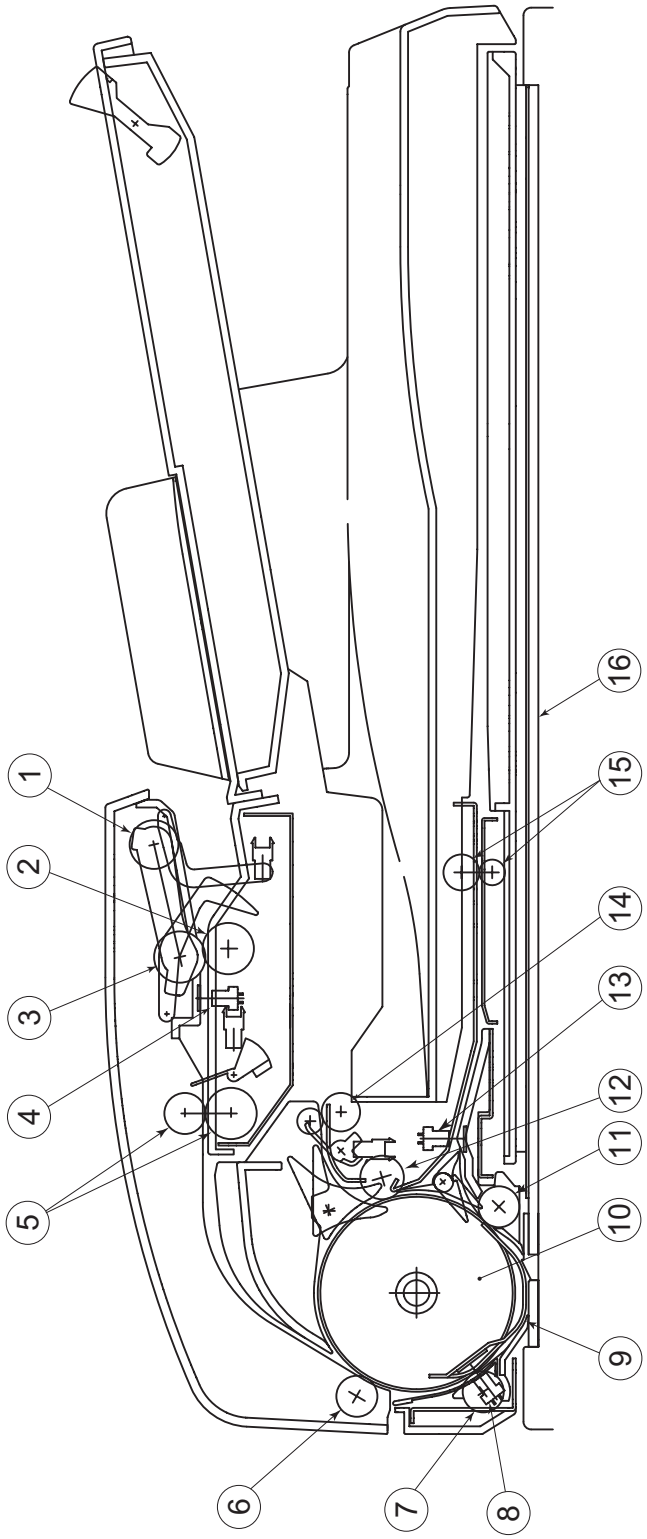


Fig.16-1

Symbols used in the checklist

Cleaning		Coating		Replacing		Data
A	Cleaning with alcohol	W	White grease (Molykote)	120	Every 120k copies (Number of scanning sheet in RADF)	User's name
○	Cleaning with soft pad, cloth or vacuum cleaner	AV	Alvania No.2			Serial No.
				Δ	Replace if deformed or damaged	Inspector's name
						Remarks

General Maintenance Checklist

Item to inspect	Cleaning 30K	Coating	Replace every 1K copies × 1,000	Remarks
1. Pickup roller	A		120	
2. Separation roller	A		120	
3. Feed roller	A		120	
4. Original length sensor	○			
5. Registration roller	A			
6. 1st small roller	A			
7. 2nd small roller	A			
8. Read sensor	○			
9. Read guide	○			
10. Read roller	A			
11. 3rd small roller	A			
12. 4th small roller	A			
13. Reverse sensor	○			
14. Exit sensor	A			
15. Reverse roller	A			
16. Platen sheet	○ or A			

16.2 Rewriting ROM (Firmware Updating)

It is feasible to update the firmware automatically by connecting the download jig to the PC board and turning the power of the equipment ON. The download jig K-PWA-DLM-320 is used.

16.2.1 Procedure

1) Turning OFF the power of the equipment and take off the RADF rear cover.
2) Connect the download jig with the connector (CN14) on the PC board.
3) While pressing [0] and [8] simultaneously, turn ON the power. (rewriting data starts)
4) The result is displayed on the LED of the PC board.
5) Turn OFF the power of the equipment and remove the download jig.
6) Install the RADF rear cover.

* If rewriting data is failed, turn OFF the power and repeat the procedure.

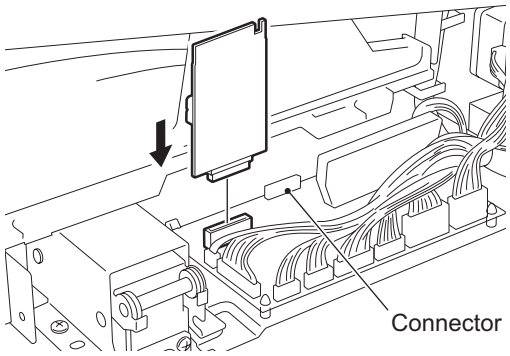


Fig.16-2

16.2.2 LED displays and contents

- When rewriting Flash ROM

Period of LED ON/OFF	Contents
LED ON	Turns ON when connection of the download jig is recognized. Keeps turning ON until the Flash ROM rewriting is succeeded or failed.
100 msec/100 msec	When the boot areas of the Flash ROM and other ROMs are different.
100 msec/900 msec	When the checksum of the ROM is incorrect.
900 msec/100 msec	When the Flash ROM erasing is failed.
2000 msec/2000 msec	When writing to the Flash ROM is failed.
1500 msec/1500 msec	When the checksum of the Flash ROM is incorrect even though the writing to the Flash ROM has succeeded.
500 msec/500 msec	When the writing to the Flash ROM has succeeded.

- At normal operation

Period of LED ON/OFF	Contents
500 msec/1500 msec	When the checksum of the Flash ROM is incorrect.
750 msec/750 msec	Ready

17. CIRCUIT DIAGRAM / HARNESS DIAGRAM

17.1 Circuit Diagram

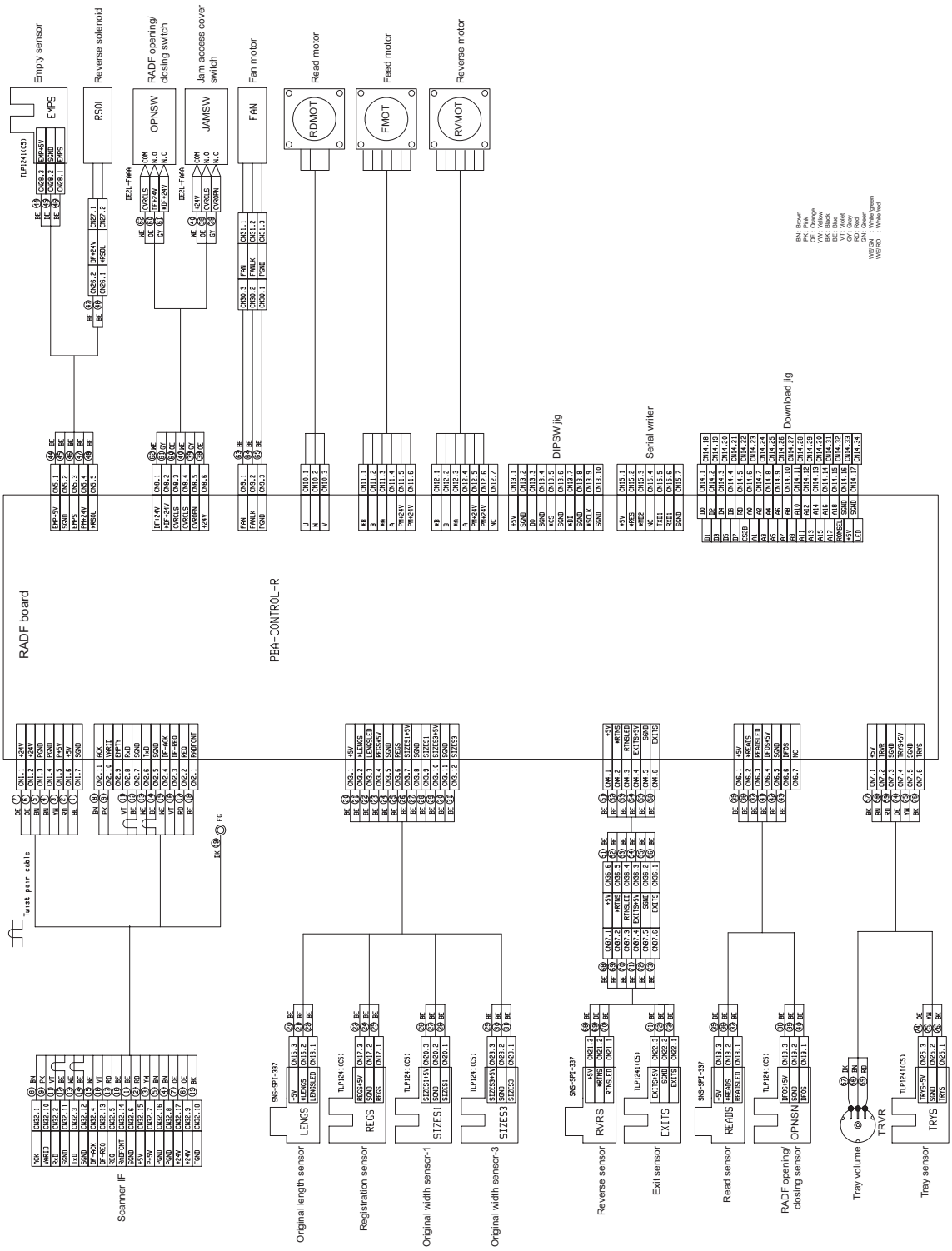


Fig.17-1

17.2 Harness Diagram

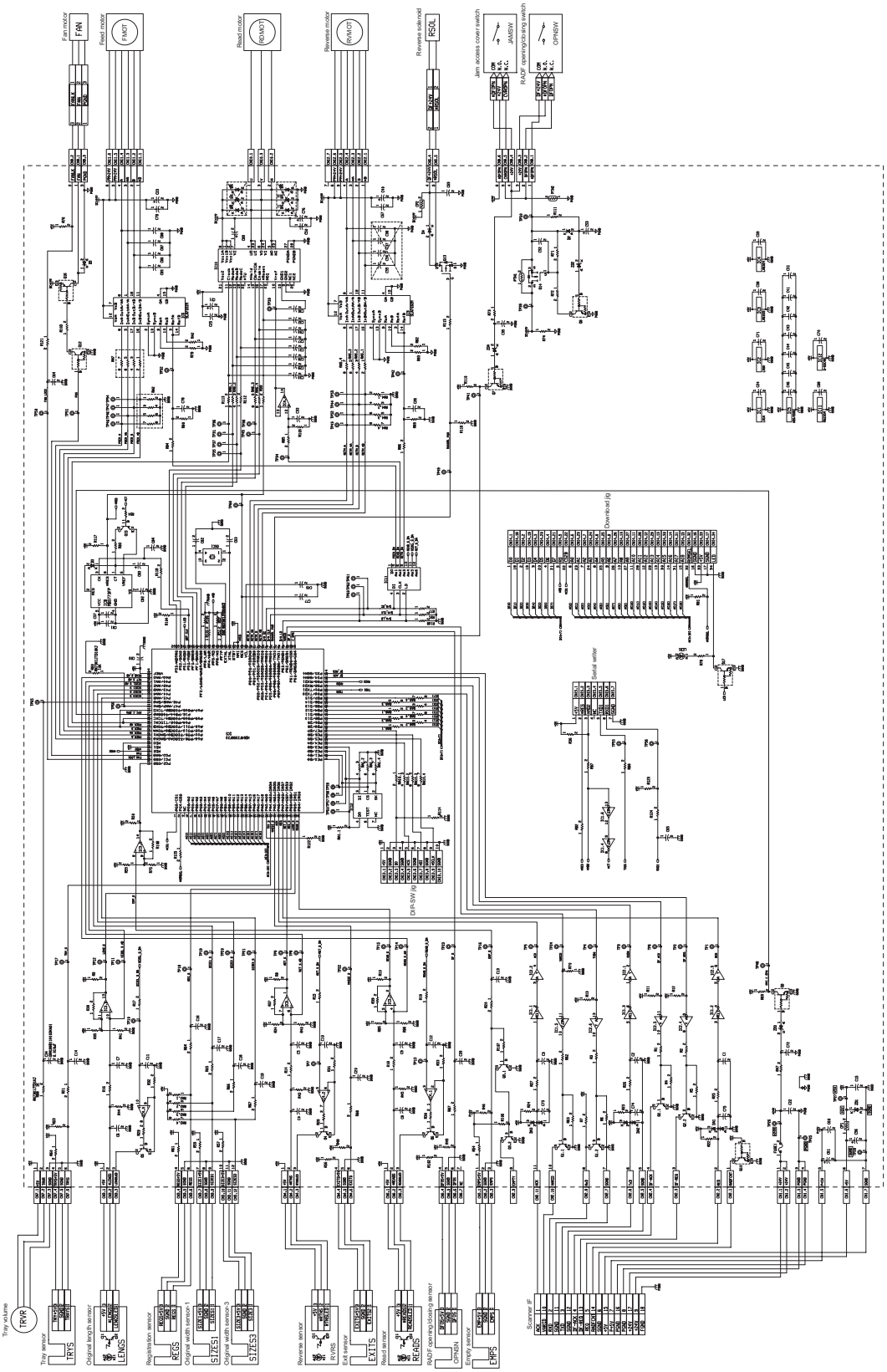


Fig.17-2

17.3 Control PC Board Circuit

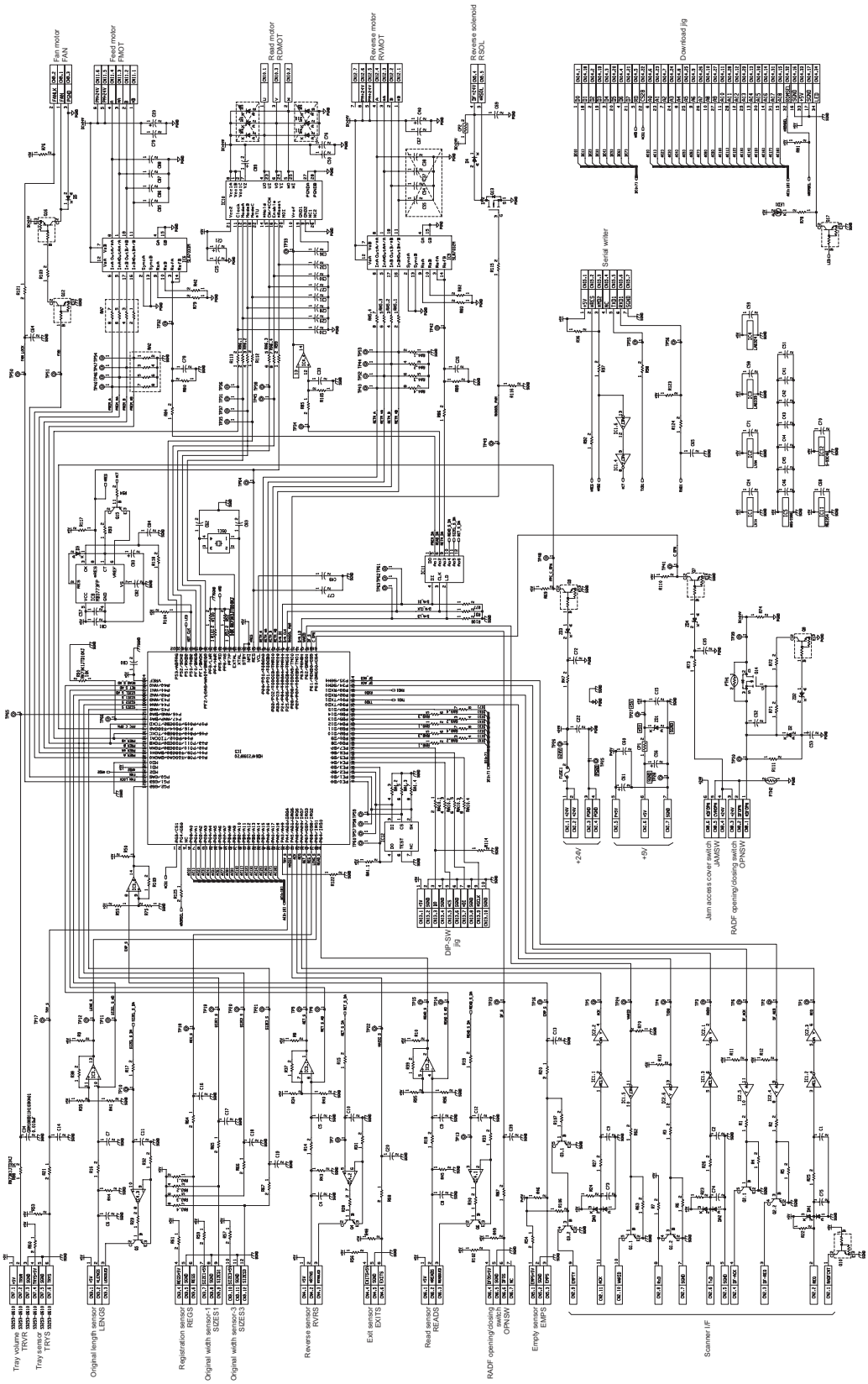


Fig.17-3

TOSHIBA

TOSHIBA TEC CORPORATION

2-17-2, HIGASHIGOTANDA, SHINAGAWA-KU, TOKYO, 141-8664, JAPAN